

Ace Training Classes

June 5, 2002

Note: All of these talks are in Adobe PDF format, and require your browser to be setup to view them (for example, with GS on Linux, GSview on PCs, or Adobe Acrobat Reader on PCs and Macs). If you need help doing this, ask one of the operations managers (or almost anyone half-way knowledgeable in your system).

Introduction:

[Operations Guidelines](#) - Steve Hahn

[Emergency Response Procedures \(ERPs\)/Safety Training](#) - Steve Hahn

[Detector Overview](#) - Steve Hahn

[ACnet](#) and [Shot Setup](#) - Bill Orejudos

[Monitoring & Control Systems](#) (MCS/iFIX) - Dave Ambrose

[DAQ Overview](#) - Frank Chlebana

[Triggers and Scalers](#) - Greg Feild

[Trigger Inhibits](#) and [Trigger Tables](#) - Jonathan Lewis

Silicon Monitoring and Controls

- [Radmon](#) - Andy Hocker
- [Powering/Cooling/Monitoring](#) - Chris Hill

[Consumer Monitors](#) - Kaori Maeshima

[Silicon DAQ](#) - Steve Nahn

[Run Control and Configuration](#) - Bill Badgett

[Hardware EVB and Level 3](#) - Arkadiy Bolshov

[Consumer Server/Logger](#) - Tony Vaiciulis

Combined Ace Shift Procedures:

[Calibration Procedures and Analysis](#) - Arnd Meyer

[Shot Setup and Data Taking](#) - Jay Dittmann

Updates from Weekly Ace Meetings:



Operations Guide

Steve Hahn
Introduction and
Operations Guide
01/16/2002

● CDF Operations Guidelines

- Defines roles and responsibilities of shift crew and supporting personnel
- During data-taking running, 24/7 operations with on-shift crew (in control room):
 - Scientific Coordinator (SciCo) – shift leader
 - DAQ Ace – data-taking
 - Monitoring Ace – safety and data quality
 - Consumer Operator – data quality
- 24 hour support from process systems technicians downstairs in cryo area (x3632) – current tech(s) on main iFIX page

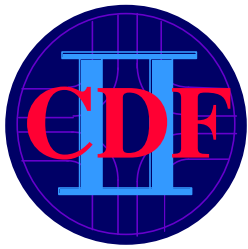
} Two aces per shift
generally swap
alternate days



Shift Support

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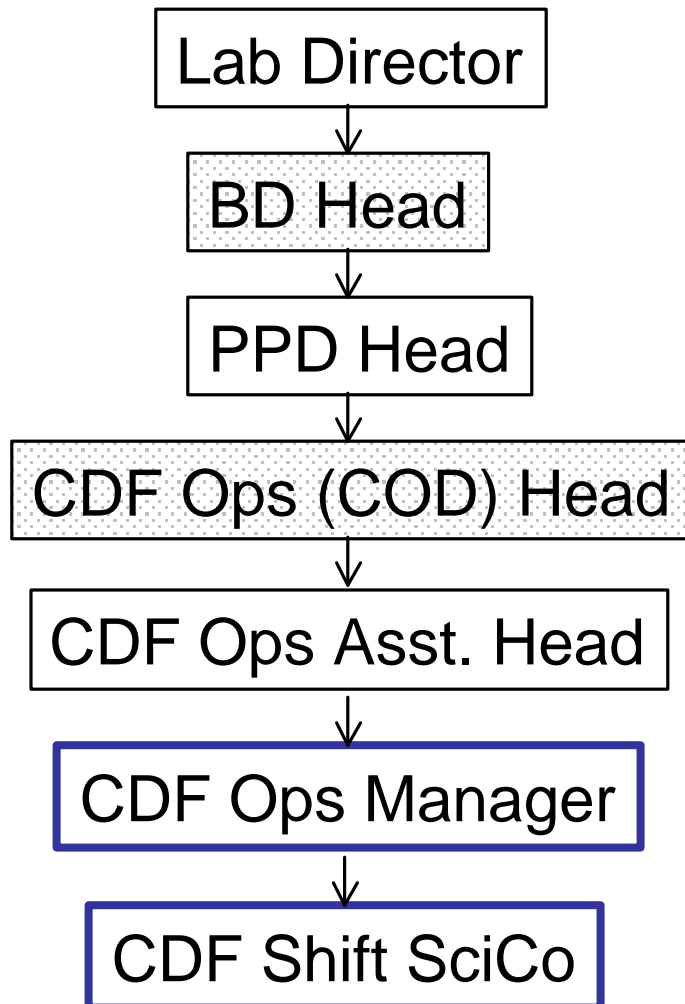
- Other off-shift support (most with pagers or cell phones) for shift crew:
 - Operations manager
 - SVX radiation damage control officer (RadCo)
 - DAQ experts
 - CDF Mechanical Group, CDF Detector Group
 - CDF Offline Group
 - Etc. etc. etc.
- Long list of pagers
 - Latest version on web
 - Paper copies around the control room
 - Keep calling until you get help; call all numbers listed (not everyone sleeps with their pager or cell phone)



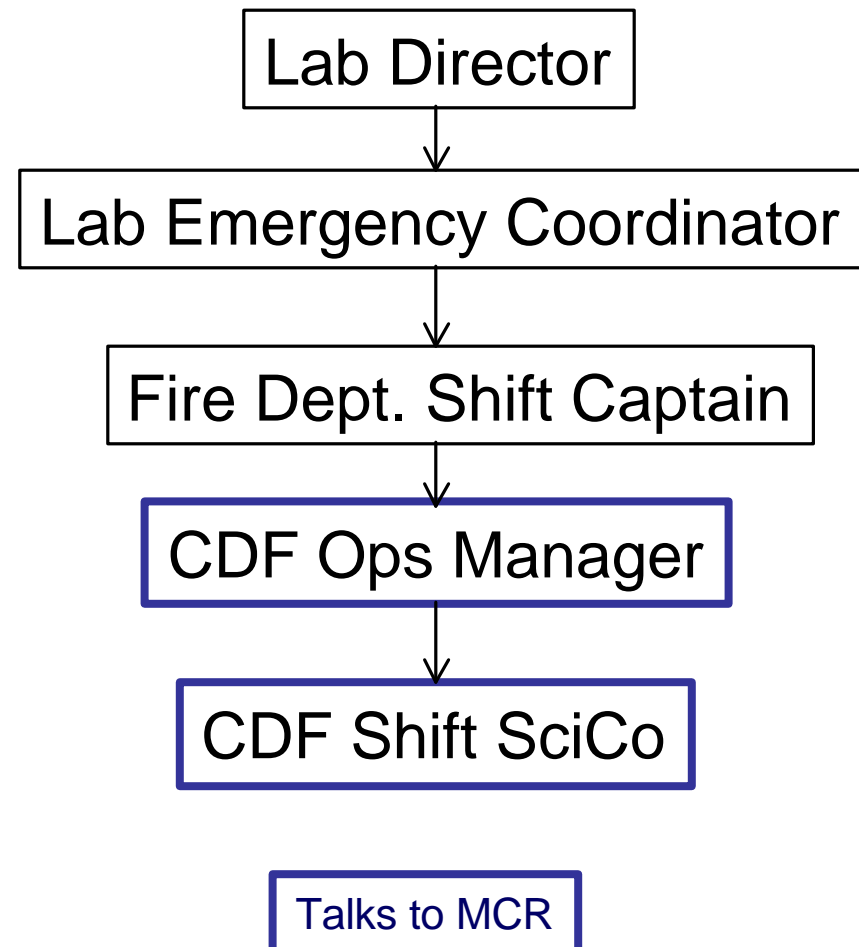
Chain of Command

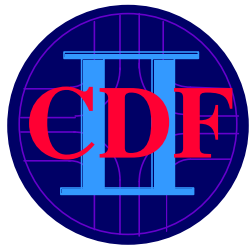
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Normal Operations



Emergency Situation

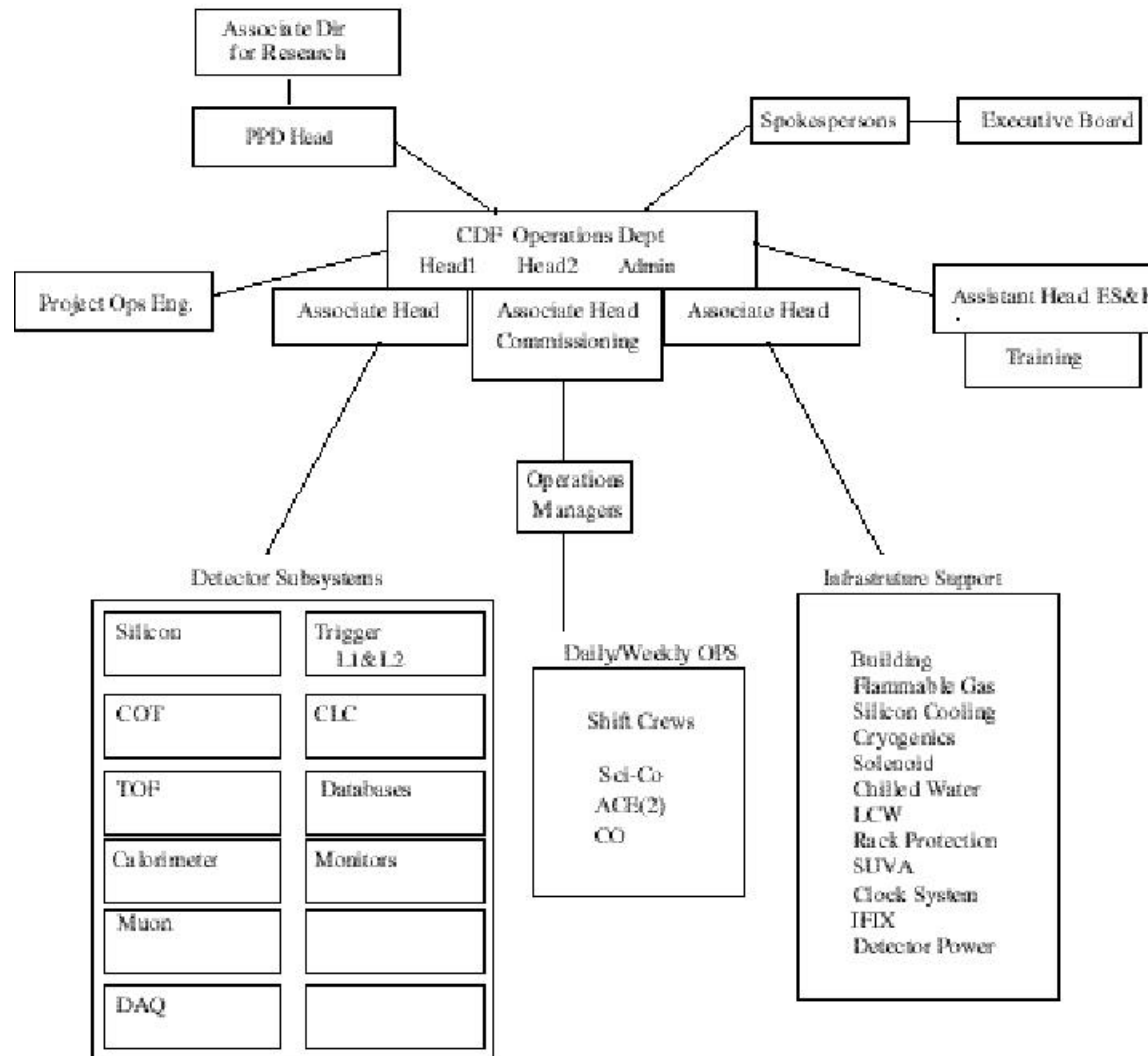




Operations Group

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CDF Operations Department
1/16/01





Operations Group

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- Co-Heads – Jeff Spalding, Mike Lindgren
- ES&H Head – Keith Schuh
- Associate Head – Jimmy Proudfoot
- Training – Dee Hahn
- Operations Managers
 - Dave Ambrose
 - Kevin Burkett
 - Jay Dittmann
 - Arnd Meyer
 - Bill Orejudos
 - Rotation (every week, usually seven days) kept on web
 - All ops managers have pagers
 - Active ops manager has
 - pager (314-4862)
 - cell phone (846-0600)
 - Steve Hahn (emeritus) – cell phone (399-0135)



Shift Roles

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- Operations Associate Head

- Sets priorities and goals for run
- Maintains Run Plan
- May act as Ops Manager if needed

- Ops Manager

- Shift priorities
- Runs daily operations meeting
- Posts daily run plan
- Coordinates shutdowns/accesses
 - Ops Man **MUST** be contacted before any access
- Liaison to BD; attends BD meetings
- Reports to All Experimenters meeting

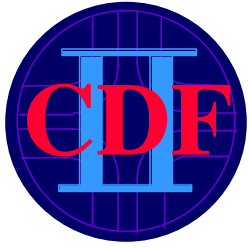


Shift Roles

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- Scientific Coordinator (SciCo)
 - Communicates with MCR
 - ERP implementation
 - Heads shift
 - Daily Operations Meeting shift summary
 - Shift resource allocation
 - Maintains logbook
 - Helps maintain downtime logger

- Both Aces
 - Assist ERP implementation
 - Enter information in logbook



Shift Roles

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- DAQ Ace
 - Runs data acquisition and calibrations
 - Assist other DAQ users
- Monitoring Ace
 - Investigates alarms, assists in recovery procedures
 - Monitors CDF Infrastructure systems (flammable gas, cryogenics, SUVA, silicon cooling, rack protection, LCW, ECW, HVAC) through iFIX
 - “Takes preemptive actions to minimize experiment down time”
 - Monitors data quality
 - Monitors beam conditions from ACnet
 - Maintains downtime logger
 - Assists consumer operator



Shift Roles

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- Consumer operator
 - Runs and checks data monitors
 - online consumers
 - calibration results
 - Notifies appropriate personnel of problems



Integrated Safety Management and Emergency Response Procedures

ISM & ERP
01/15/2002

From the Directorate:

"Do work safely."

- Fermilab policy:
 - Fermilab employees and users will only conduct work and operations in a safe and environmentally sound manner.



Integrated Safety Management
and
Emergency Response Procedures

ISM & ERP
01/15/2002

Priorities

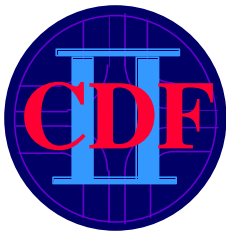
1 You

2 Others if you do not put yourself at risk

3 The environment if you do not put
people at risk

4 The experiment if you do not put
people or the environment at risk


When in doubt, dial 3131



Integrated Safety Management (ISM)

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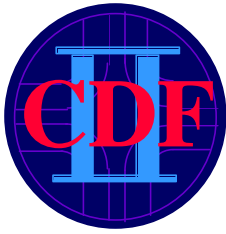
● Principles:

- Line management responsible for safety 
- Clear roles and responsibilities
- Competence commensurate with responsibilities
- Balances priorities
- Identification of safety standards and requirements
- Hazard Controls tailored to work
- Operations authorization

● Core functions:

- Define work
- Analyze hazards
- Establish controls
- Perform work
- Provide feedback and improvements

ES&H Dept.
Safety Committees
Work Permits (WPs)
Job Hazard Analyses (JHAs)
Operational Readiness
Clearances (ORCs, pORCs)

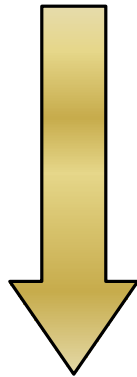


Integrated Safety Management (ISM)

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01/15/2002

● PPD Implementation of ISM

- CDF is in Particle Physics Division of Fermilab (PPD), though we must also worry about Beams Division (BD) restrictions since collision hall is part of Tevatron
- “...more eyes on the hazards and mitigation of the hazards are needed to find and avoid the more exotic problems.”



PPD Implementation
of
Integrated Safety Management (ISM)
and
Fermilab ES&H Manual (FESHM) Chapter 2060

PPD_OPER_004

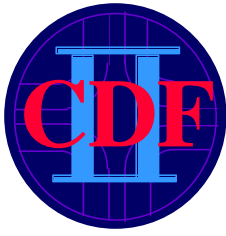
I. Introduction

This document describes the PPD Implementation of ISM and FESHM 2060.

Within PPD our focus is work planning. A hazard analysis and mitigation of the hazards is a natural part of this planning. Approval of the work and notification of supervisors about work plans is the standard procedure, and review of completed work to improve future work should be a part of our standard practice. Throughout the rest of this document, the term “**Work Plan/Hazard Analysis**” will be used to summarize this process.

This implementation is not intended to challenge the competence of trained and experienced people. We are working towards safety performance at a new level where more eyes on the hazards and mitigation of the hazards are needed to find and avoid the more exotic problems. We also need to be alert for accident situations stemming from several ordinary hazards working in concert. “More eyes” includes writing Work Plan/Hazard Analysis, having the written plan reviewed by experts in some cases, having every individual on a work team read and sign the written plan, and having the approved written plan distributed to the next level in line management.

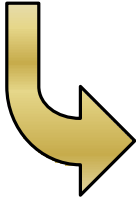
This implementation is intended to follow FESHM 2060. Instead of references to FESHM chapters or to CFR (Code of Federal Regulations), this PPD document attempts to collect the full set of FESHM 2060 guidance and other special PPD concerns in terms of simple phrases for easy everyday reference.



Integrated Safety Management (ISM)

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“Line management Responsibility for Safety” includes everyone in the division.



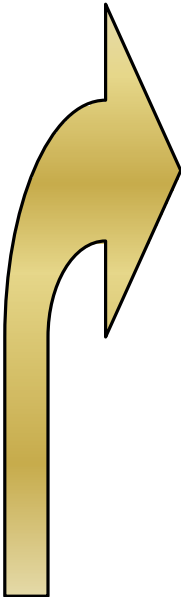
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III. Responsibilities of Individuals

- ◆ "Line Management Responsibility for Safety" includes everyone in the division. We are all part of the "line". It is expected that individuals will follow the ISM core functions for every task. These functions are:

- Define the work
- Analyze the hazards associated with the task(s)
- Take action to mitigate those hazards
- Perform the work within the hazard controls
- Provide feedback to allow improvements

In your daily work, you should use these five core functions as your work guide.



- ◆ PPD requires a written Work Plan/Hazard Analysis if:

- Your task involves two or more of the hazards in Table 1.

Note: your judgement is required. For example, PPD does not expect a full written hazard analysis if you are working on a ladder 6 feet above the floor and there is an electrical outlet nearby (this is not an electrical hazard). PPD does expect a full written hazard analysis if you are modifying a pressurized system from a ladder position 6 feet above the floor.

If there are two hazards due to faulty equipment, e.g. a frayed electrical cord, PPD expects you to fix the hazard before beginning the task. Do not write a hazard analysis.

Contact your supervisor for help if you have questions.

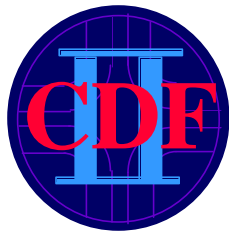
- Your task involves one of the PPD High Level hazards in Table 1.

Note: your judgement is required. PPD expects you to be on alert for all hazards. PPD does not expect you to consider every potential hazard as a "high hazard". Contact your supervisor for help if you have questions.

- ◆ You should work with your supervisor to develop a written Work Plans/Hazard Analysis when required. Usually a team of individuals and a supervisor will collaborate to write the document.

- ◆ You should read and sign the Work Plan/Hazard Analysis before performing the task.

- PPD requires a written Work Plan/Hazard Analysis if:
 - Your task involves two or more of the hazards in Table 1.
 - Your task involves one of the PPD High Level hazards in Table 1.



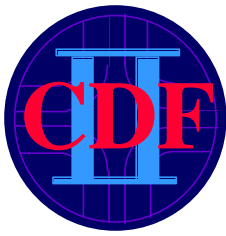
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Table 1. List of Hazards and thresholds indicating "high-level" hazards faced by individuals in PPD.

Hazard (If your task has TWO hazards, write a Work Plan/Hazard Analysis)	PPD "High-Level" Hazards (If your task has ONE high-level hazard, write a Work Plan/Hazard Analysis)
Radiation Radiation areas at Fermilab are labeled --work in a <u>Controlled Area</u> or in a <u>Radiation Area</u> is a hazard. However, work in a Controlled Area by people already specifically trained for the radiation hazards in that area is NOT a hazard. Known radioactive objects at Fermilab are labeled with a "Class" sticker -- work on such objects is a hazard. Work with radioactive sources is a hazard.	Work in a <u>High Radiation Area</u> . Work on Class 2-5 radioactive objects. Work with contaminated objects. Work with radioactive liquids. Work with depleted Uranium. Moving sources between buildings.
Electrical Work Hazards are electrocution and injuries associated with arc blast (burns, hearing loss, flying debris).	Work activities near or on exposed electrical conductors, circuits, or equipment that are or may be energized and where there is a <u>significant potential</u> for arcing, flash burns, electrical burns, or arc blast. Any work on an AC electrical power distribution system.
Electronics Work A hazard if a worker is likely to be exposed to voltages, currents, or stored electrical energy of sufficient magnitude and duration to startle or injure if shocking, arcing, sparking, or heating should occur. Workers must have Basic Electrical Safety training.	Work activities near or on exposed electrical conductors, circuits, or equipment that are or may be energized and where there is a <u>significant potential</u> for arcing, flash burns, electrical burns, or arc blast. Any work with non-commercial electronics or with electronics modified at Fermilab has a greater hazard potential, particularly in the prototype stage.
Confined Space Work Work in a space that: <ol style="list-style-type: none"> 1. Is large enough and so configured that you can bodily enter <u>and</u> perform assigned work; <u>and</u> 2. Has limited or restricted means for entry or exit; <u>and</u> 3. Is not designed for continuous occupancy. 	Entry into a " <u>Permit Required Confined Space</u> " -- these are labeled and indicate a potential hazardous atmosphere or other safety hazard in the confined space.
Fall Hazard Work from a ladder at 6 feet or more above the floor. Work from a scissor lift. Work on low slope roofs (less than 4" rise in 12" horizontal). For clarification, work from previously approved scaffolding is NOT a hazard.	Work from a ladder if 3 of 4 limbs cannot maintain contact with the ladder. Work from a ladder set on uneven or slippery ground. Work from an articulating lift device (e.g. a "cherry picker" or other such single arm device). Work at 6 feet above floor without guardrails. Work on high slope roofs. Any new use of scaffolding, including erection of the scaffolding.
Mechanical Hazards Potential for release of stored energy through falling, rotating, or other unplanned movement. Note that standard moves of objects with Crane, Hoists, and Forklifts are covered below.	Work with a mechanical system that has the potential to release stored energy in excess of 60,000 foot-pounds. Examples are: 50 tons at 1 foot off the floor, 3 tons at 10 feet off the floor. Any unusual arrangement of heavy objects, even if below 60,000 ft.-lb. energy. Other mechanical stored energy hazards (e.g. springs) require calculation.
Moving Mechanical Hazards Potential for injury from computer controlled moving objects.	Work in an area where an employee can be caught between objects. Work near unguarded rotating shafts.
Hazards in "first time use" of new equipment Potential hazard with any first time use of mechanical or electrical equipment if a <u>significant injury</u> could occur.	First time production work with new equipment designed or modified at Fermilab if a <u>significant injury</u> potential exists. Examples: start of production with a large new mechanical machine is a high hazard, but starting use of a small low-power printed circuit board is not.
Crane, Hoist & Forklift Usage Material handling with this equipment can have a significant potential for injury if done improperly. Below-the-hook lifting devices must be approved fixtures. Employees must be trained and qualified to operate the device.	If exceptional care is required due to size, shape, or close installation tolerance of a particular load. For clarification, it is not usually a high hazard to perform a "standard lift", e.g. a lift within the crane weight limit of a standard shield block using the lift eye or to lift other loads with an approved lifting fixture.
Hydraulic System Hazards These systems can run at several thousand pounds per square inch, so small leaks can be a hazard without eye protection.	Any work where a sudden uncontrolled release (failure) of pressure could result in injury (e.g. people working around a heavy object supported hydraulically could get "caught between"). Work with modified hydraulic systems.
Excavation and Digging Any digging or soil boring with motorized equipment. Any digging (even by hand) where utilities or unsanitary conditions may be encountered. Any digging where on-lookers are present and could be injured.	Digging deeper than 4 feet. Digging into a radiation shield berm. Any excavation that could become a confined space -- for example within or under a building.
Flammable Gas Hazard Flammable gas areas are classified by fire risk and must be reviewed to determine the risk class (unreviewed areas are Class 2). Work in a Risk Class 0 area (risk of small local flash fire) is a hazard.	Work in a Flammable Gas Risk Class 1 Area (risk of local fire) or in a Risk Class 2 Area (risk of a general fire).



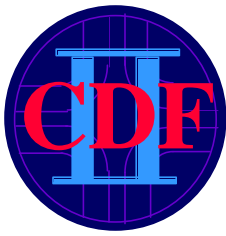
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Table 1 continues.

Hazard (If your task has TWO hazards, write a Work Plan/Hazard Analysis)	PPD "High-Level" Hazards (If your task has ONE high-level hazard, write a Work Plan/Hazard Analysis)
Cryogenic Hazards Working with solids, liquids, or gases colder than -150 C.	Working with more than 200 liters of cryogenic material.
Oxygen Deficiency Hazard (ODH) Working in areas that can have large releases of gases to reduce the oxygen concentration below 19.5%. Work in an ODH-1 area is a hazard.	Working in an area classified as <u>ODH-2 or above</u> is a high hazard.
Chemicals Use of materials that are flammable, combustible, corrosive, reactive, toxic, caustic, or poisonous. Use of any material that because of the quantity and/or manner it is being used is hazardous to the health of the worker. MSDS are always required and every employee must have HazCom training in how to read an MSDS. Containers must always be properly labeled.	Work with solvents, reactive or corrosive chemicals in large amounts or in a poorly ventilated area. Work with poisonous chemicals (e.g. plating solutions containing cyanide). Work with highly reactive chemicals (e.g. battery acids, metal cleaning solutions containing a high % of hydrofluoric acid). Work with known carcinogens or cancer-suspect agents (e.g. benzene or methylene chloride or chloroform). Any work with explosive chemicals. Any work with new chemicals synthesized at Fermilab. Occasional use of small amounts (500 ml) of consumer products or other chemicals available from the stockroom is not a high hazard.
Hazardous Substances Chemical Carcinogens, Lead, Asbestos, Beryllium and Beryllium Alloys are hazards to workers.	Direct handling of Lead, Asbestos, Beryllium (even when passivated), and Beryllium alloys is always considered a high hazard, but packaged or encapsulated objects are low hazards. Work with known carcinogens or cancer-suspect agents. Clean-up (abatement) work is always a high hazard.
Work with Regulated Pollutants Work that will generate a WASTE product with a chemical that has a flash point below 140 degrees F, a pH below 2, a pH greater than 12.5, or which contains any toxic substance (see MSDS).	Any work that will generate <u>more than 5 gallons</u> of regulated waste. Any work with chemicals where a significant spill is possible and likely to get into the environment (e.g. drain or ditch nearby). The "significant" level will depend on the chemical. Work that will generate a mixed (radioactive + regulated) waste.
Machining and Grinding Moving machinery operated without appropriate guards. Work with the employee in an unusual or awkward position (e.g. overhead grinding is an eye hazard). Sparks from these operations must be controlled.	Machining or grinding hazardous materials such as lead, magnesium, beryllium Removal of structural welds on large weldments (fall hazard may result).
Repetitive Task Hazards Work at an inappropriately designed computer setup. Assembly work with repetitive tasks.	Four consecutive hours of repetitive assembly work. Jobs that may aggravate a pre-existing medical condition. Assembly jobs that have caused previous repetitive injuries.
Noise Hazards Eight hours of work in an environment where you must raise your voice (but not shout) to be heard.	Two hours of work per day in an environment where it is necessary to shout in order to be heard. Work that exceeds a posted noise hazard limitation. (Typically 8 hrs @ 85 dBA).
Other Work Environment Hazards Respiratory hazards from dust, animal waste, ... Work in areas of excessive heat or cold. Work from awkward positions.	Continuous work in temperatures above 86 degrees F or below -25 degrees F must be evaluated.
Magnetic Field Hazards Iron objects in a magnetic field can move. Cardiac pacemakers, metallic implants, and other medical devices can function improperly in magnetic fields as low as 2.5 gauss.	Work near any area with a fringe field of more than 1 kilogauss in air over an accessible region more than 1 foot long in all directions. Any time averaged exposure of people to 300 gauss or more. Any situation where ferrous objects can be subject to magnetic forces causing sudden unexpected movement.
Lasers Laser systems can present electrical, chemical, and eye or skin hazards from intense visible light. Lasers are classified on a scale of 1 (safe) to 4 (dangerous).	Work with a Class 3b or higher laser (training is required).
Work with Pressure / Vacuum Systems Potential for rupture or implosion. Modification of a pressure system is a hazard. Unusual or rare operation of a pressure or vacuum system is a hazard.	Work on systems with a pressure greater than 150 psi. Work with a vacuum chamber larger than 35 cubic feet and larger than 12 inches in diameter. Work with thin vacuum windows greater than 12 inches in diameter.
Welding, flame cutting, brazing, open flame work Hazards are fire, eye injury, thermal and ultra violet burns, noise, ventilation, toxic fumes. Welding work in an area where passers-by can see the arc.	Any flame cutting on an existing structure.
Work in spaces controlled by other Divisions Potential for unknown hazards.	Always considered a high hazard until analyzed. This includes all Collision Halls.



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You are required to have Work Plans/Hazard Analyses reviewed if the work passes any of the thresholds in Table 2.

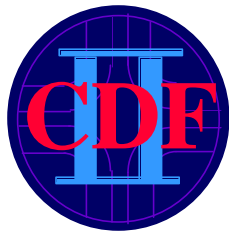
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IV. Responsibilities of Supervisors and Group Leaders

- ◆ The term "Supervisor" or "Group Leader" within PPD includes Detector Project Managers at all WBS levels and Task Managers of T&M activities. As a supervisor of other employees, you have a special responsibility for safety of those employees. **When you assign work to employees, you are responsible for ensuring that Work Plans/Hazard Analyses are written as required by this document.**
- ◆ **You are required to have a written Work Plan/Job Hazard Analysis for tasks done by your employees if their work passes any of the following thresholds:**
 - The task involves two or more of the hazards in Table 1.
 - The task involves one hazard at the "high level" defined in Table 1.
 - The task involves at least one hazard from Table 1 with a work crew where individual responsibilities of each crew member should be clearly spelled out.
 - The task is outside of the normal duties and responsibilities for your group and involves one or more hazards from Table 1.
(e.g., your group is called to a new area to "help out", or your group is assigned a new permanent and continuing task)
 - The task involves complex activities of more than one day duration and at least one hazard from Table 1.
(You should consider having daily toolbox meetings to review the complexities each day. But this is not required if a simple task is just being repeated every day.)
 - **If in your judgement the task is complicated and would be done more safely using a written Work Plan/Hazard analysis, then write one!**
- ◆ **For tasks that recur often**, it is permissible to write a generic Work Plan /Hazard Analysis good for one calendar year. All such generic plans expire on December 31 every year and must be reviewed, amended as needed, and re-approved following the instructions below.
- ◆ **You are required to have Work Plans/Hazard Analyses reviewed if the work passes any of the thresholds in Table 2.**

Table 2 indicates who should do the review, either a designated PPD Approver, a PPD Department Head, a PPD ES&H Review Committee, or the Division Head. If an obvious reviewer cannot be identified, contact the Division Office.
- ◆ **If the work is below the thresholds in Table 2, no further approval is required.**
- ◆ **Once you have a written plan, you have the following additional responsibilities:**
 - **Discuss the work plan with all involved employees, and get each employee to sign the Work Plan/Hazard Analysis as a record that the job was understood. Post a copy near the work area if possible.**
 - **Keep the Work Plan/Hazard Analysis for your employees on file for one year.**
 - **Provide a copy of the Work Plan/Hazard Analysis up the line in the PPD Line Management as detailed in the PPD Organization chart.**

See Table 2 for additional guidance. Supervisors provide copies to Group Leaders, and Group Leaders provide copies to Department Heads. If you have both a department head (e.g. Support Services) and a project leader (e.g. CMS Project), provide a copy to both.



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Table 2. Hazard vs. Review Matrix.

Hazard	Designated PPD Approver threshold (Who Approves)	Department Head	ES&H Review for use as part of an Experiment	PPD ES&H Department	Division Head
Radiation	Work in a High Radiation Area, or on Class 2-5 objects, or with contaminated objects, radioactive liquids, or depleted Uranium requires a permit. (PPD Radiation Safety Officer)	Notify	Any sources or rad. materials used, sources embedded in detectors	Notify Notify before moving a source to another building.	Notify -----
Electrical Work	Work on AC electrical power distribution system requires an Electrical Work Permit. (Electrical Coordinators)	Notify			Notify Must approve all hot work.
Electronics Work	If "significant potential" for arcing, flash burns, electrical burns, or arc blast. (Immediate Supervisors)	Notify	Systems with non-commercial or modified equipment. Any large capacitor banks.		
Confined Space Work				If known hazards require a Confined Space Permit	Notify
Fall Hazard	Any new scaffolding erection. (PPD Scaffold Competent Person)	Notify		Notify	
Mechanical Hazards	Work with a mechanical system that has the potential to release stored energy in excess of 60,000 foot-pounds. (PPD Engineering Approver)	Notify	over 3 tons supported above floor over 10 tons		Always notify. Must approve if potential energy release is above 500,000 ft-lbs.
Moving Mechanical Hazards	Work with unguarded rotating machinery. (PPD Engineering Approver)	Notify	Moves faster than 5 feet per second	Notify	
Hazards in "first time use" of new equipment	Machines designed or modified for use at Fermilab require an approved procedure before production use. (PPD Engineering Approver)	Notify			Notify
Crane, Hoist & Forklift Usage	Below-the-hook lifting devices require review. (PPD Engineering Approver)			Notify	Approves unusual use (e.g. outside rated load limit)
Hydraulic System Hazards	Fermilab designed or modified systems require review. (PPD Engineering Approver)	Notify			
Excavation and Digging	Excavation permit for any earth removal. (Task Manager or Construction Coordinator)	----- -----		Notify Permit for any Berm alteration.	----- Notify
Flammable Gas Hazard		Approves work in Flammable Gas Class 1 or 2 areas.	Any use of flammable gas or mixtures	Notify	Approves all Flammable Gas installations
Cryogenic Hazards	Any work with more than 200 liters of cryogenic material. (PPD Engineering Approver)		Any system with inventory exceeding 200 liters		Approves operation of any system with inventory exceeding 200 liters
Oxygen Deficiency Hazard	Work in ODH-1 areas. (Immediate Supervisors)	Approves work in any area classified as ODH-2 or higher	Any use of oxygen displacing gases	Notify for ODH-2 work.	



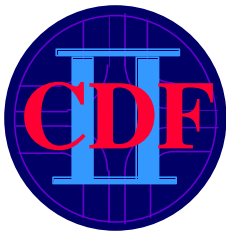
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01/15/2002

PPD_OPER_004

Table 2 continues.

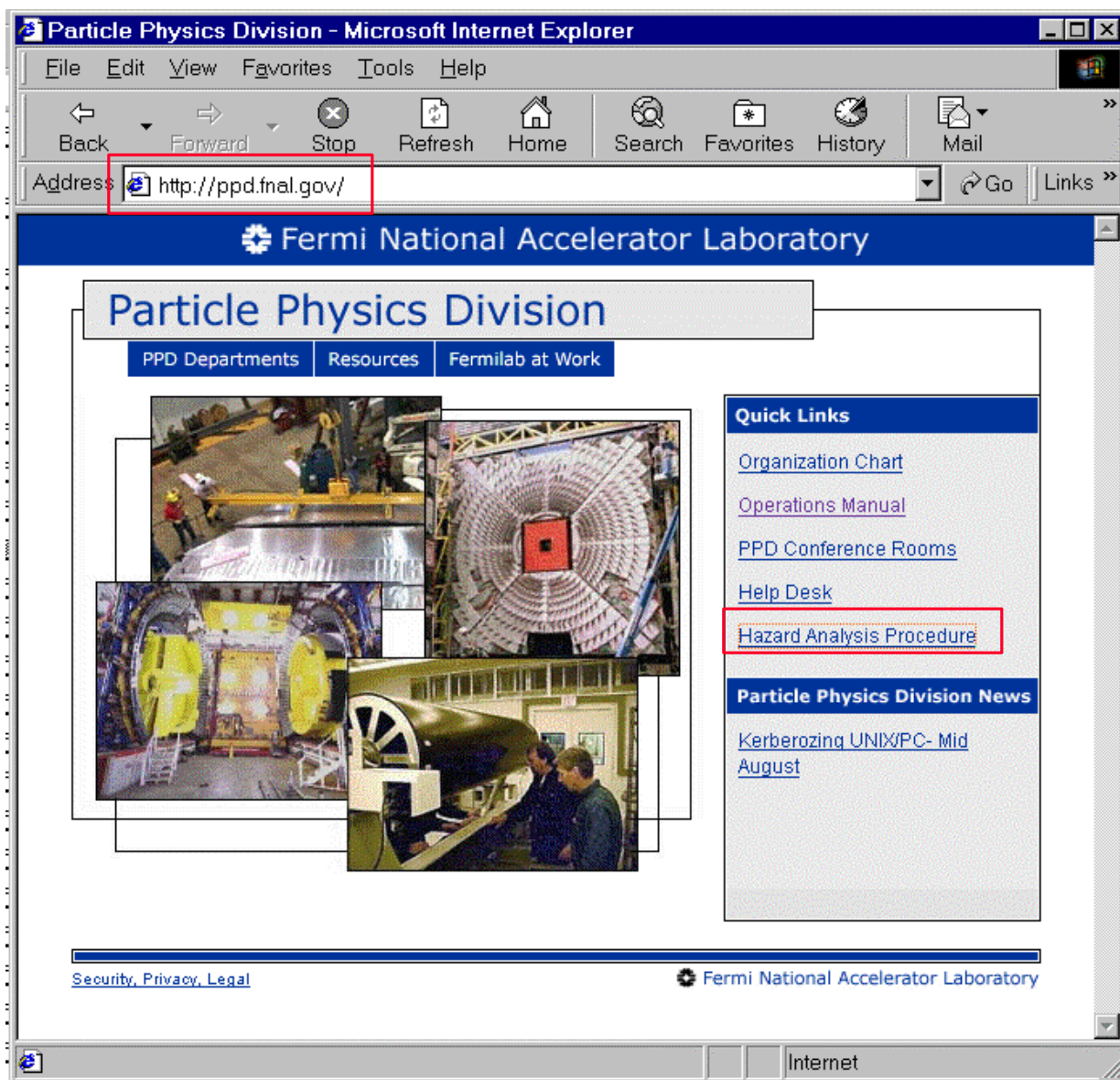
Hazard	Designated PPD Approver threshold (Who Approves)	Department Head	ES&H Review for use as part of an Experiment	PPD ES&H Department	Division Head
Chemicals	Work with solvents, reactive or corrosive chemicals in large amounts or in a poorly ventilated area. (Immediate Supervisors)	Notify		Any work with poisonous, highly reactive, explosive, or carcinogenic chemicals. Any work with new chemicals synthesized at Fermilab.	Notify
Hazardous Substances		Approves direct handling written procedure in advance of work	Any toxic / hazardous materials planned or used	Approves all abatement work.	Notify for Direct Handling & Abatement.
Regulated Pollutants	Any work that will generate greater than 5 gallons of hazardous waste. Any work where a significant spill is possible and likely to get into the environment. (PPD Environmental Protection Officer)	Notify		Notify	
Machining and Grinding				Approves any work with hazardous materials.	Notify for work with hazardous materials.
Repetitive Task Hazards	All repetitive assembly work taking more than 4 hours per day. (Immediate Supervisor)	Notify		Notify	
Noise Hazards				Approves if more than 8 hrs work in an area above 85 dbA.	Notify
Work Environment Hazards	Continuous work in temperatures above 86 degrees F or below -25 degrees F. (Immediate Supervisor)	Notify			
Magnetic Field Hazards	Fringe fields over 1 kilogauss in air extending over 1 cubic foot. Potential mechanical movements due to magnetic fields. (PPD Engineering Approver)	Notify		Any time average exposure of people to 300 or more Gauss	
Lasers	Any work with a Class 3b or higher laser. (Laser Safety Officer in ES&H)	Notify	Any use of any class	Notify	Notify
Work with Pressure / Vacuum Systems	All pressure vessels and vacuum vessels require an engineering review. (PPD Engineering Approver)	Notify	Review of all vessels	Notify	Following test, approves operation of all pressurized systems > 200 SCFH and all vacuum systems > 35 cubic feet
Welding, flame cutting, brazing, open flame work	All work requires a Burn Permit. (Fermilab Fire Department for permit, PPD Senior Safety Officer for work plan approval)				
Work in space controlled by another division		Notify			Approves all such work.

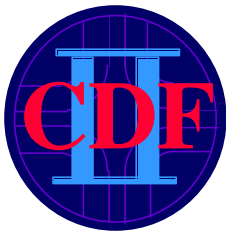


Integrated Safety Management (ISM)

ISM & ERP
01/15/2002

- So, where do I find the PPD implementation of ISM?





Emergency Response Procedures (ERPs)

ISM & ERP
01/15/2002

● OK, what about the ERPs?

Scientific Coordinator Information - Microsoft Internet Explorer

Address: <http://www-b0.fnal.gov:8000/scicohelp/scicohelp.html>

4. Responsible for hour-by-hour detector operations.

5. Attends 0800 Operations Meeting with report from previous day.

6. Arbiter of allocation during shift (partitions, crates, power on/off, etc.).

7. Makes sure e-logs are well documented for shift.

Some Helpful Links

- Emergency Response Procedures
 - [Run 1 Safety Procedures](#)
 - [Run 2 Safety Procedures](#)
- ACNET:
 - [Main ACNET help page](#)
 - Tutorials: [0](#), [1](#), [2](#), [3](#)
 - [Shot Setup](#)
- SciCo Silicon Responsibilities
 - [When to turn the Silicon to](#)
 - [Monitoring Ace's Silicon In](#)
 - [Silicon Radiation Monitor](#)
- Global Alarms Page
- Consumers
 - [DBANA](#)
 - [List of Consumer Monitors](#)
 - [Starting the Consumers](#)
 - [Current Consumer Status](#)
 - [Event Display](#)
- Accelerator
 - [MCR E-log](#)

List of CDF II Procedures - Microsoft Internet Explorer

Address: <http://www-cdf.fnal.gov/htbin/cdfproc/listProc>

List of CDF II Procedures

Safety Procedures ([Safety Procedures](#))

([Procedure Procedures](#))
([CDF Solenoids Cryo System Operational Procedures](#))
([Gas System Operational Procedures](#))
([CDF Mechanical Group Operational Procedures](#))
([CDF Electrical Group Operational Procedures](#))
([CDF Particle Instrumentation Group Operational Procedures](#))
([Other CDF Operational Procedures](#))
([CDF Technical guidelines and permits](#))

[[Fermilab ES&H Section Home Page](#)]

Safety Procedures:
(Numbered CDF II PROC-001 through CDF II PROC-100)

CDF II PROC-001	Emergency Response Procedures	Approved
CDF II PROC-004	DF Supervised Access Procedure	Approved
CDF II PROC-008	CDF Controlled Access Procedure	Approved
CDF II PROC-013	Sign-Off Procedure Required before Flowing Flammable Gas To or Turning High Voltage	Approved

Procedure Procedures:
(Numbered CDF II PROC-101 through CDF II PROC-199)

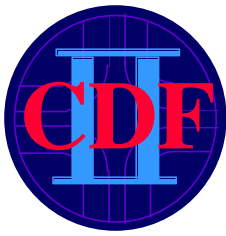
CDF II PROC-101	How to write a CDF Procedure	Approved
CDF II PROC-106	CDF-II PROC - 106 "CDF Silicon Radiation Protection Procedure"	Approved
CDF II PROC-110	"CDF Silicon Interlock Code Change Request"	Approved; 1 HPC mode



Emergency Response Procedures (ERPs)

ISM & ERP
01/15/2002

- Flow charts of actions to be taken in emergency situations
- Most current version located on CDF web pages as shown on previous page
- Color keyed
 - Black - Procedure steps
 - Red - Important safety warnings
 - Green - Expert actions/suggestions
 - Blue - Additional information or automatic actions



Emergency Response Procedures (ERPs)

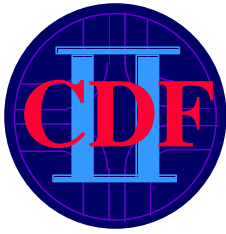
ISM & ERP
01/15/2002

● **CDF Emergency Response Procedures:**

- CDF Fire Alarm
- CDF Oxygen Deficiency Hazard (ODH) Alarm
 - Assembly Building with 1200 T shielding door closed
 - Assembly Building or Collision Hall with 1200 T shielding door open
- CDF Flammable Gas Alarm
 - Assembly Building
 - Collision Hall
 - Gas Shed (behind Assembly Building, not gas mixing shed on other side of berm)
 - COT Inerting
- Severe Weather (Tornado) Alarm
- Radiation Exposure Procedure
- Spill Procedure
- Recovery Procedure



ISM & ERP
01/15/2002

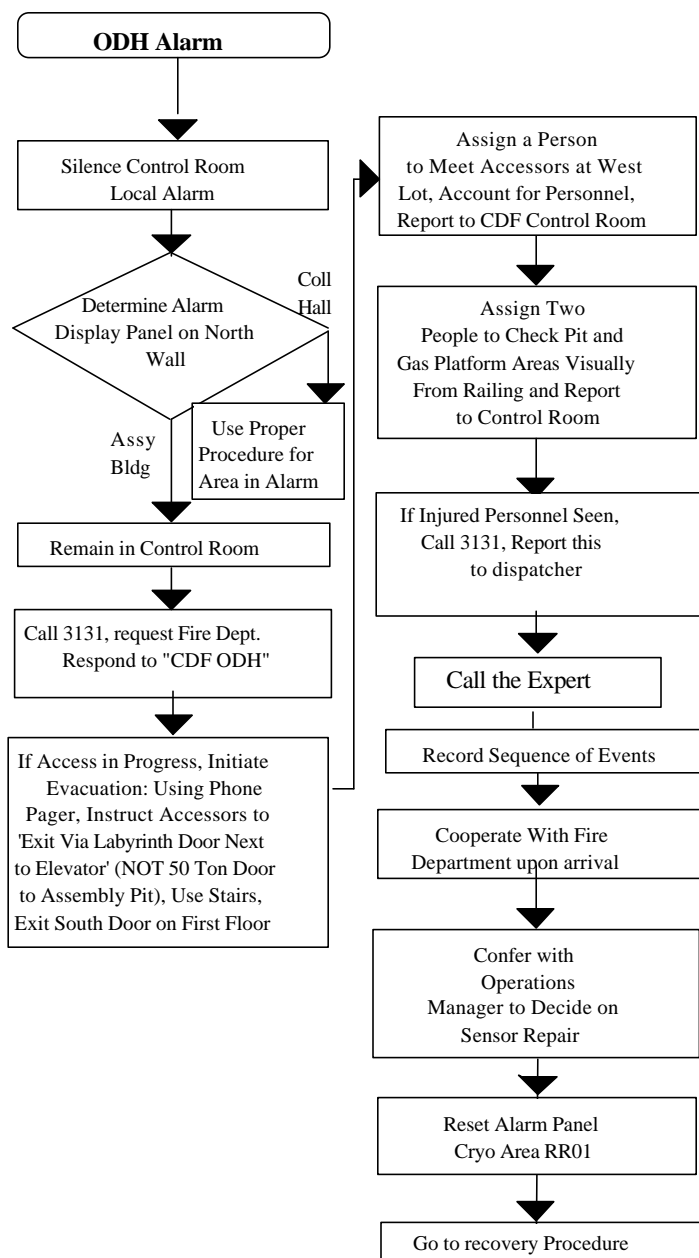


Emergency Response Procedures (ERPs)

ISM & ERP
01/15/2002

WARNING: Do Not Enter Deep Pit

CDF ODH Alarm Assembly Building 1200 Ton Shield Door Closed



Expert Investigators can do the following:

Check Alarm at Cryo Area Rack #1

Investigate Further:

1. Check for Other Alarms
2. Determine if Recent Changes are Cause From Fix
3. Have Person Check PF1,
4. Have Person Check Cryo Syst Readbacks

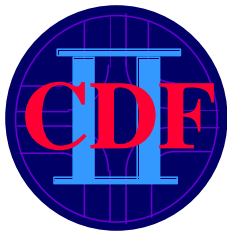
Alarm is Valid if any of the following are true:

1. Vapor Cloud or Broken Line Seen
2. More than One Sensor Indicates Latched Alarm
3. Latched Sensor Non-Normal Reading Persists
4. All Access Keys Cannot Be Accounted For (Unless Assembly Pit is Not Part of Access Area)

If Valid Alarm is Only One Non-Normal Sensor And No Other Confirming Evidence is Found, Alarm is Declared False

Automatic Actions:

Building Evacuate Alarm,
Building Evacuate Strobe,
Assembly Pit Vent. Purge,
Status Panels Display,
Assembly Pit ODH Alarm



Emergency Response Procedures (ERPs)

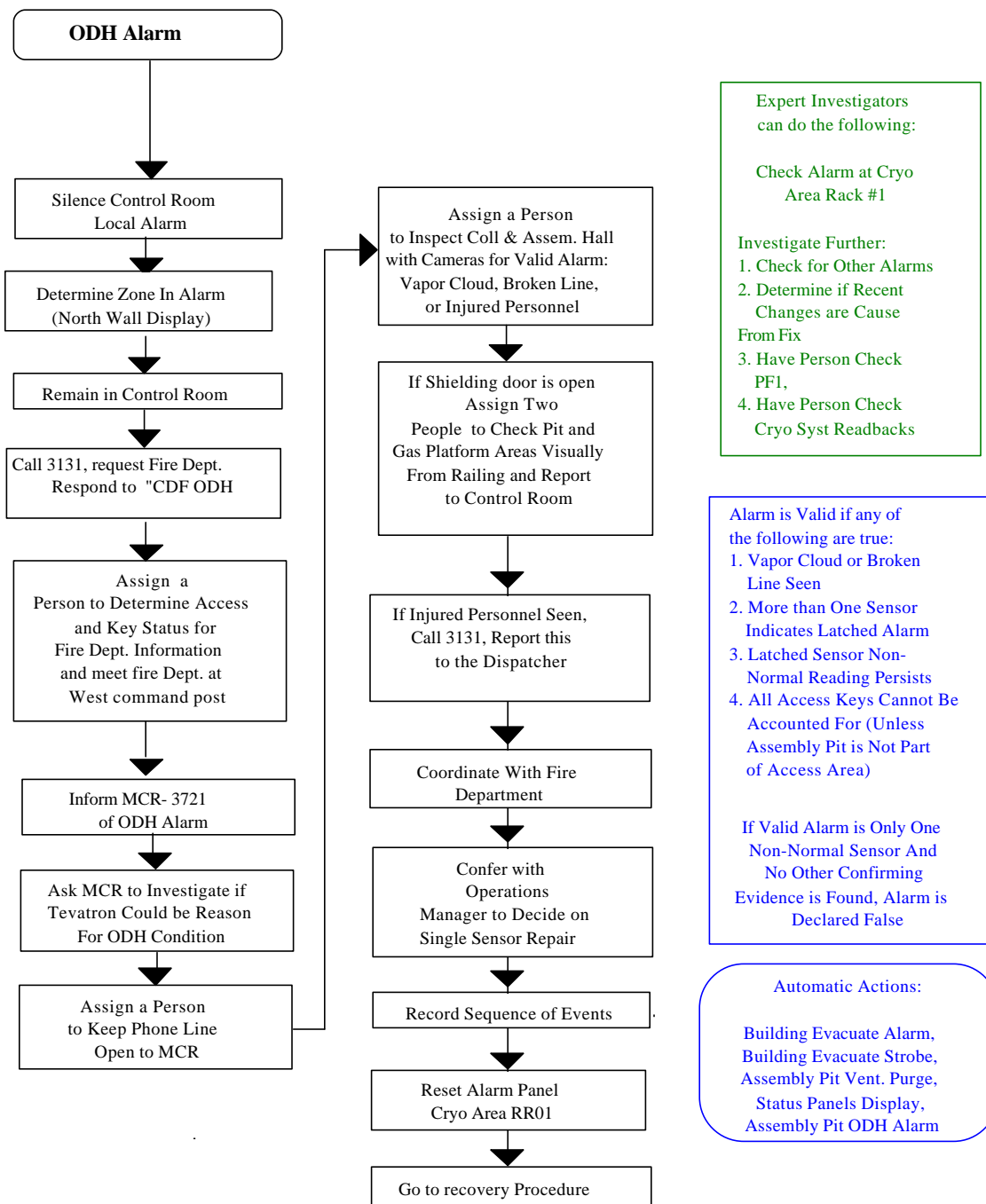
ISM & ERP
01/15/2002

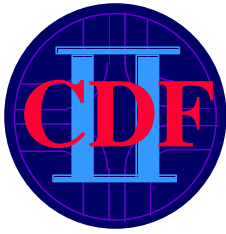
**WARNING: Do Not Enter
Deep Pit or Coll. Hall**

CDF ODH Alarm

Collision Hall
or

Assembly Building with 1200 Ton Shield Door Open





Emergency Response Procedures (ERPs)

ISM & ERP
01/15/2002

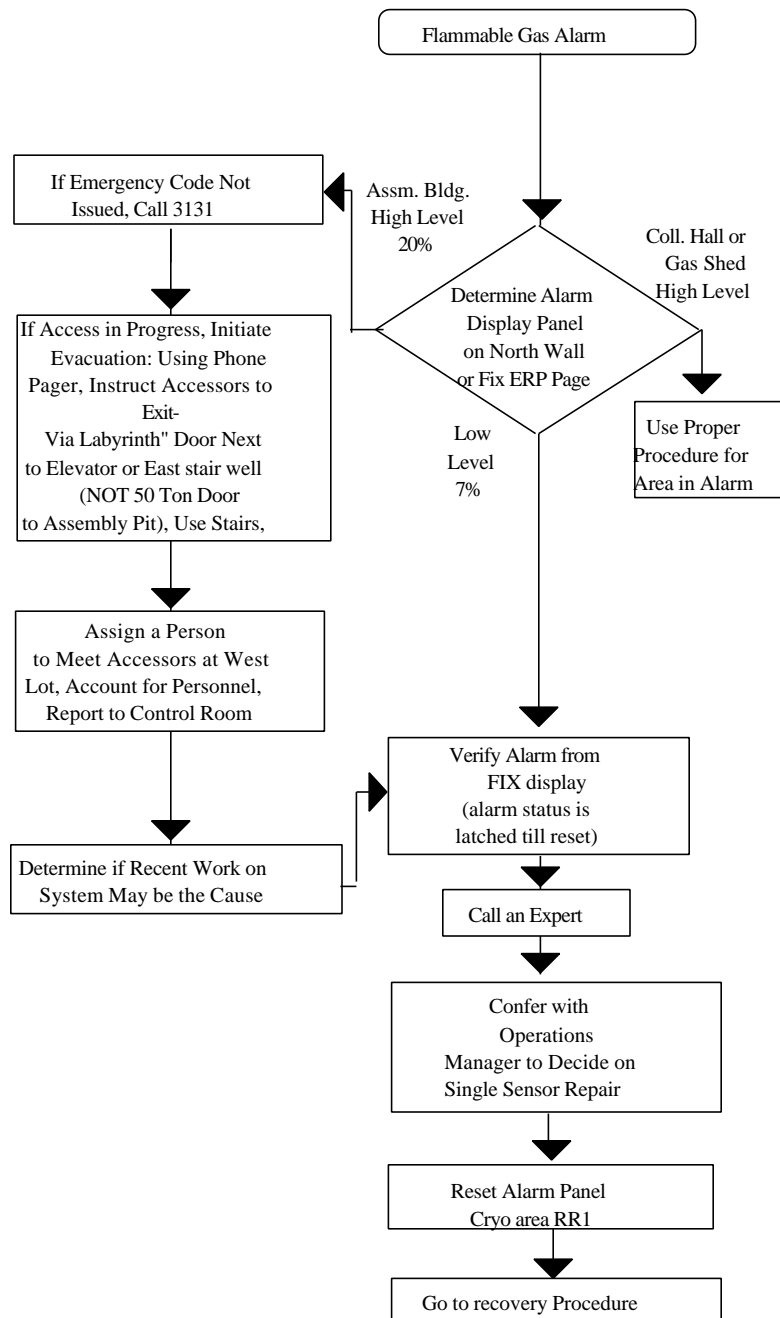
WARNING:

Experts Investigating
Must Wear Dual Function
Gas Monitors and Leave
Area if Monitor Alarms

CDF Flammable Gas Assembly Building

WARNING:

Two Man Rule in Effect



Expert Investigators
can do the following:

- A. Investigate Alarm Further Without Exposing Personnel to Hazards
- B. Determine Leak Validity and Severity at Zone Indicated Using a TIF-8800 (red) Flammable Gas Detector or by Investigating Nitrogen Purge System
- C. Close Manual Gas Supply Valve MV-2405 if High Level Alarm
In gas Shed Key is needed

Automatic Actions

Building Evacuate Alarm
Firus Message Issued
Fire dept. Responds
Flammable Gas Shutoff
High Voltage Shutoff
MG 1,2,3&4 Shutoff
Detector 60 Hz Shutoff
Assy. Bldg. Ventilation Purge

Feb. 9, 2001



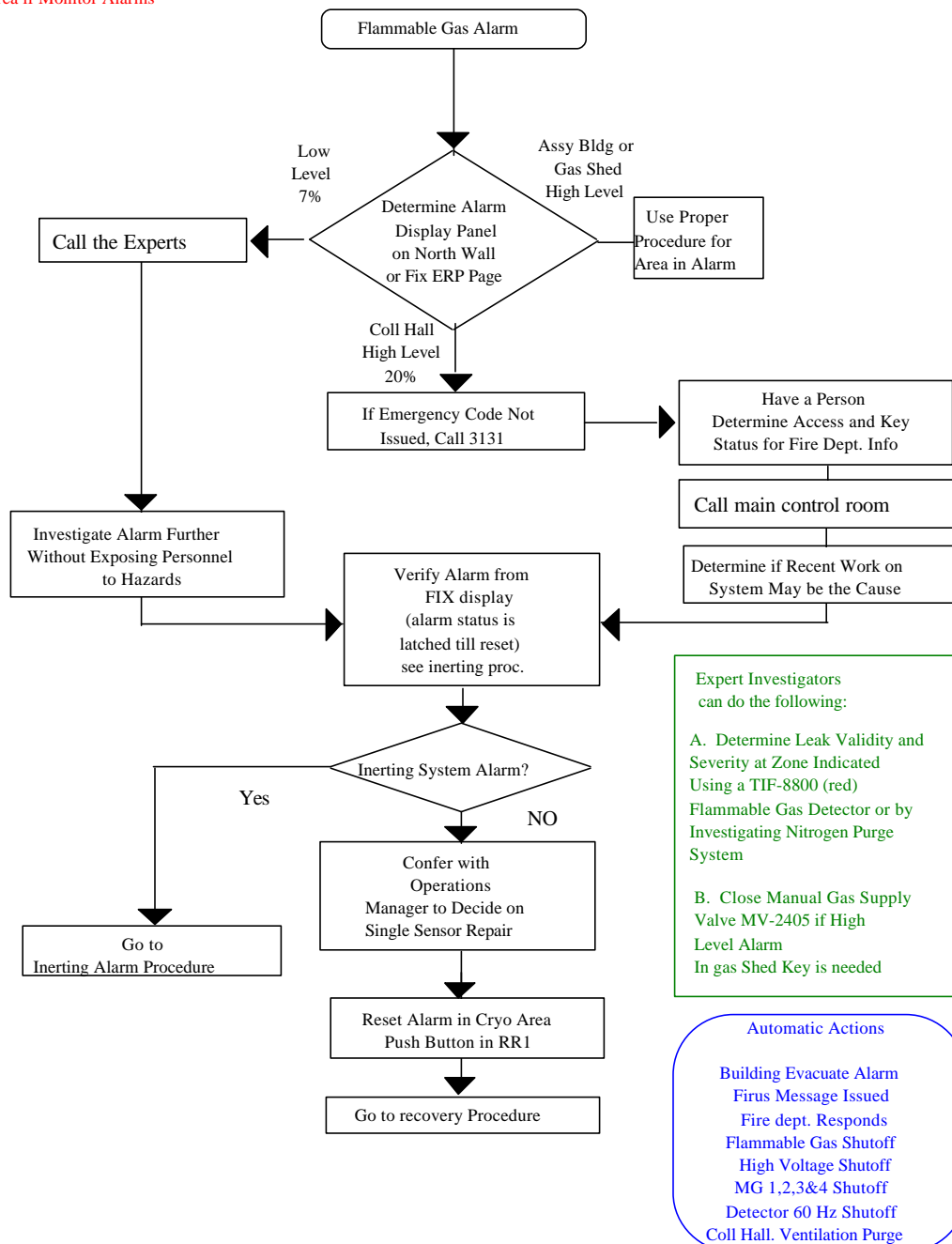
Emergency Response Procedures (ERPs)

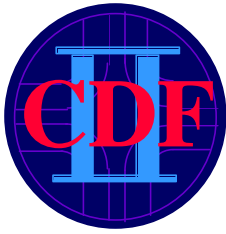
ISM & ERP
01/15/2002

WARNING:
Experts Investigating
Must Wear Dual Function
Gas Monitors and Leave
Area if Monitor Alarms

CDF Flammable Gas Collision Hall

WARNING:
Two Man Rule in Effect





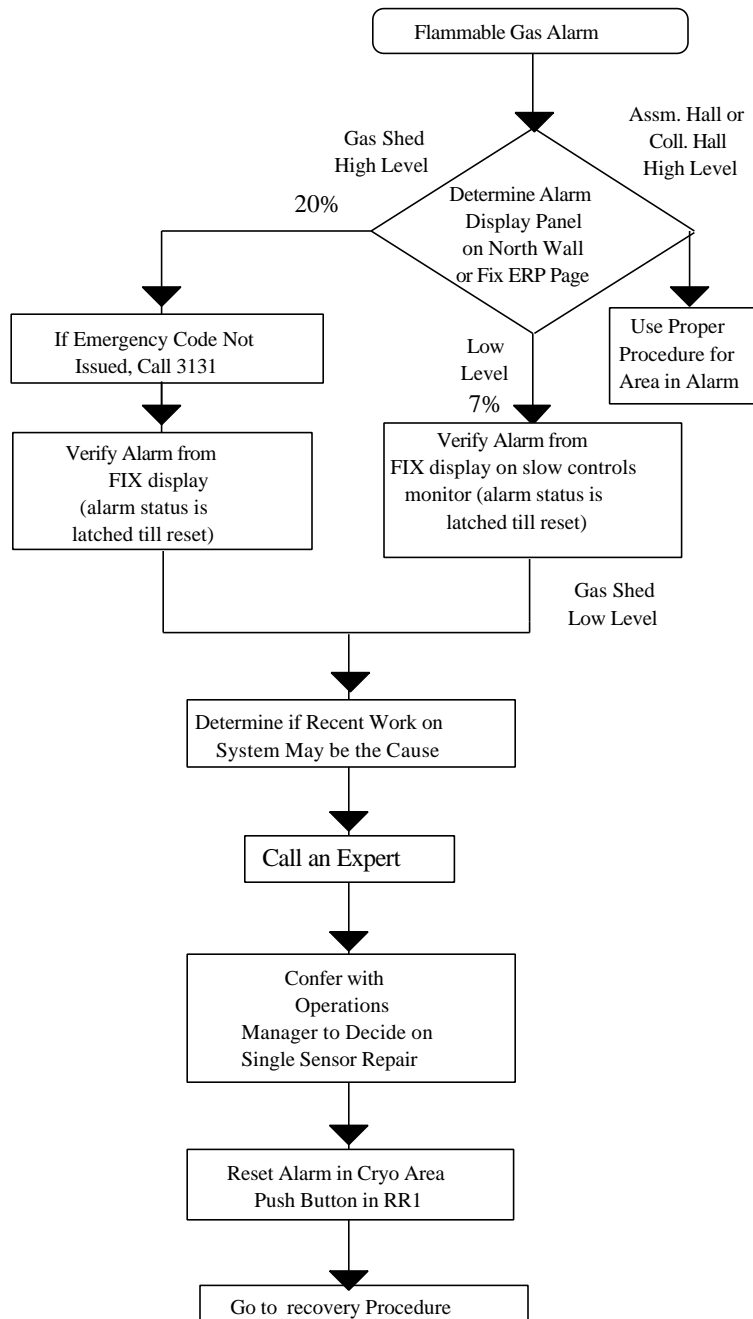
Emergency Response Procedures (ERPs)

ISM & ERP
01/15/2002

WARNING:
Experts Investigating
Must Wear Dual Function
Gas Monitors and Leave
Area if Monitor Alarms

CDF Flammable Gas Gas Shed

WARNING:
Two Man Rule in Effect



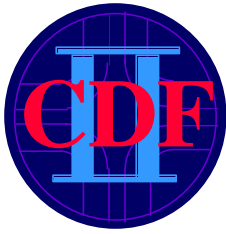
Expert Investigators
can do the following:

A. Determine Leak Validity and Severity at Zone Indicated
Using a TIF-8800 (red)
Flammable Gas Detector or by
Investigating Nitrogen Purge
System

B. If Appropriate, Shut Down
Gas System Compressor
Crash Button is outside
East side next to Gas Shed Gate

High Level
Automatic Actions:

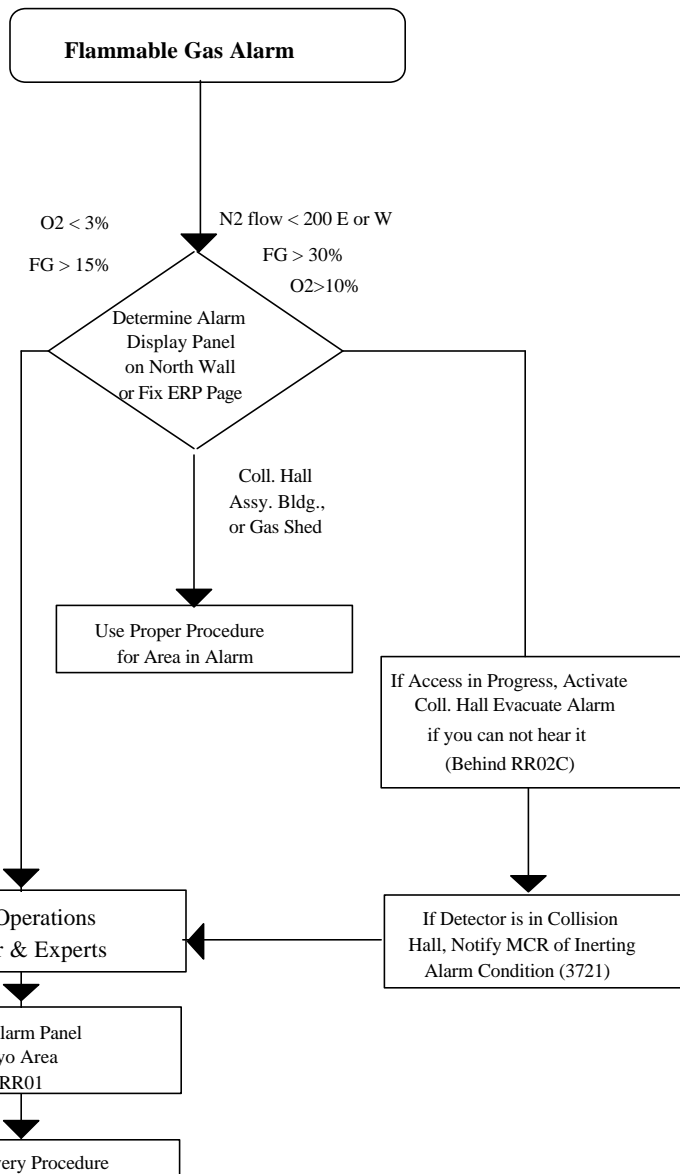
Firus Message Issued
Fire Dept. Responds
Flammable Gas Shutoff



Emergency Response Procedures (ERPs)

ISM & ERP
01/15/2002

CDF Flammable Gas COT Inerting Alarm



Expert Investigators
can do the following:

A. Check 730' Platform
Nitrogen Flow Valid Alarm:
Station 10 COTE & COTW.
Alarm will sound if either
Dwyer Gauge < 200 CFH

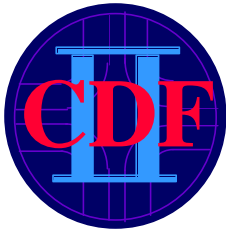
B. Check RRG04 to Verify Sample
Draw Pump is Operating &
O₂ Monitor Flow Rates are:
Sample = 50 SCFH
Air Flow = 12 SCFH

C. Verify Nitrogen
Supply is Normal
(Tank #32 > 36 PSIG &
Tank #18 > 40 PSIG)

Shift Crew Can

Verify
COT Inerting E or W Flow
switches on FIX display
Alarms Page

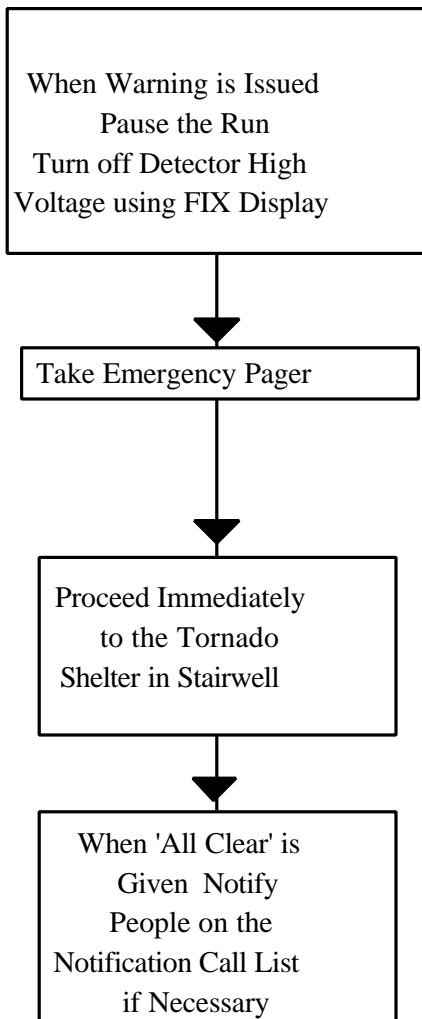
Verify Flam Gas Sensor Values
Readings on FIX Display
Low Alarm ≥ 15%
High Alarm ≥ 30%

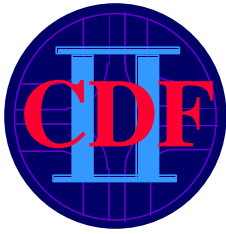


Emergency Response Procedures (ERPs)

ISM & ERP
01/15/2002

CDF Severe Weather ALARM PROCEDURE

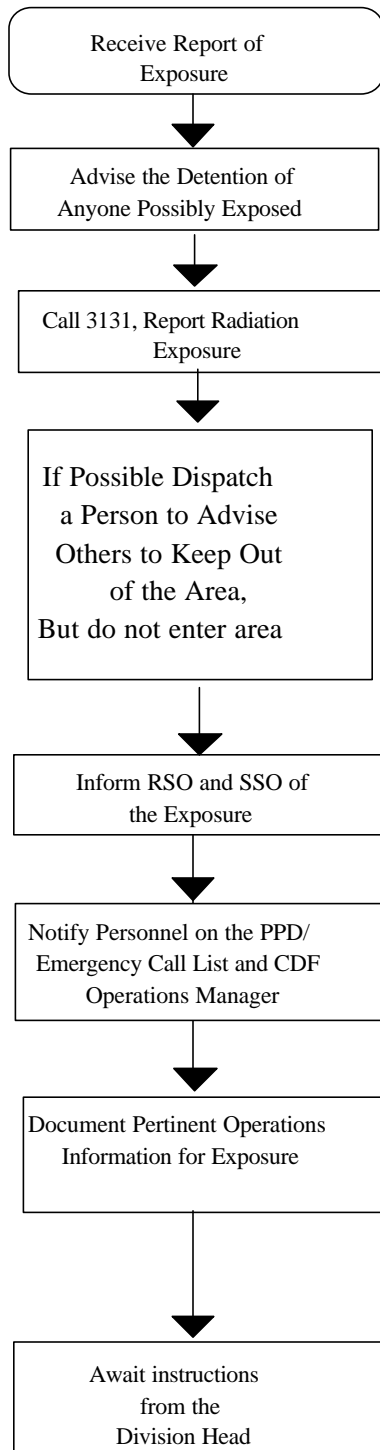




Emergency Response Procedures (ERPs)

ISM & ERP
01/15/2002

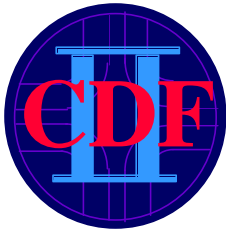
CDF Radiation Exposure



Have MCR Disable Beam to Area if appropriate

The RSO is
T.J. Sarlinal
Ex 3299

The SSO is
Martha Heflin
3511



Emergency Response Procedures (ERPs)

ISM & ERP
01/15/2002

CDF Spill Procedures

Spill of Detector
Cooling Fluid
Reported

Small quantities
(< 55 Gallons)
Can be absorbed
but must be disposed
of as special waste.
For larger spills
call 3131
**See MSDS Sheets
Next Pages**

Notify
Operations Manager
**CDF spill plan is behind
MSDS Sheets**

When 'All Clear' is
Given Notify
People on the
Notification Call List

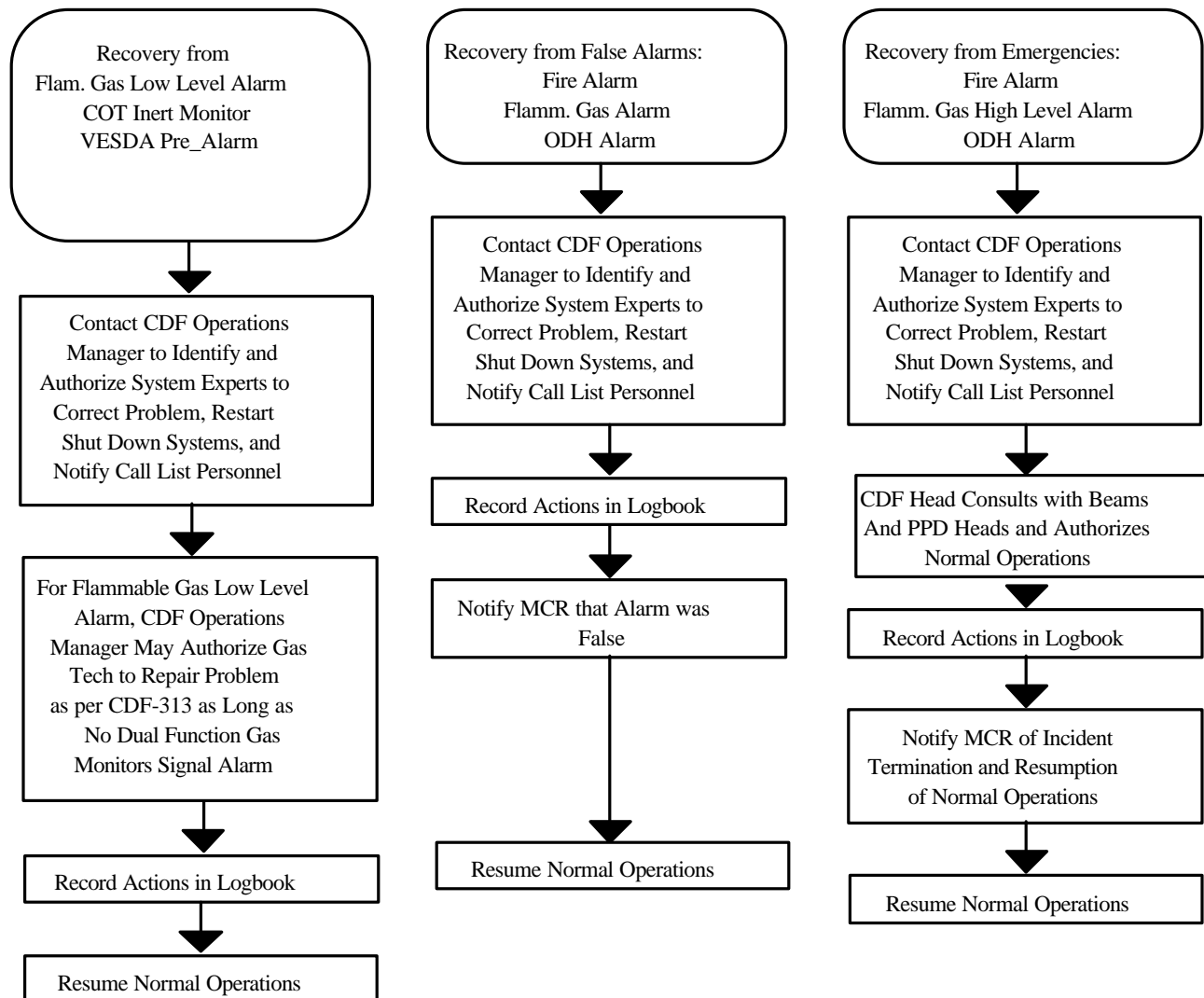


Emergency Response Procedures (ERPs)

ISM & ERP
01/15/2002

Warning: Experts with MX241
or COM26 Monitor and Escape
Pack should First Enter Pit
After ODH False Alarms

CDF RECOVERY

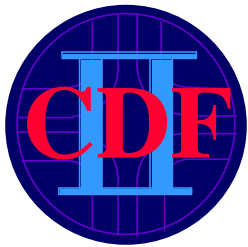




Detector Orientation

Steve Hahn
Detector
Orientation
01/15/2002

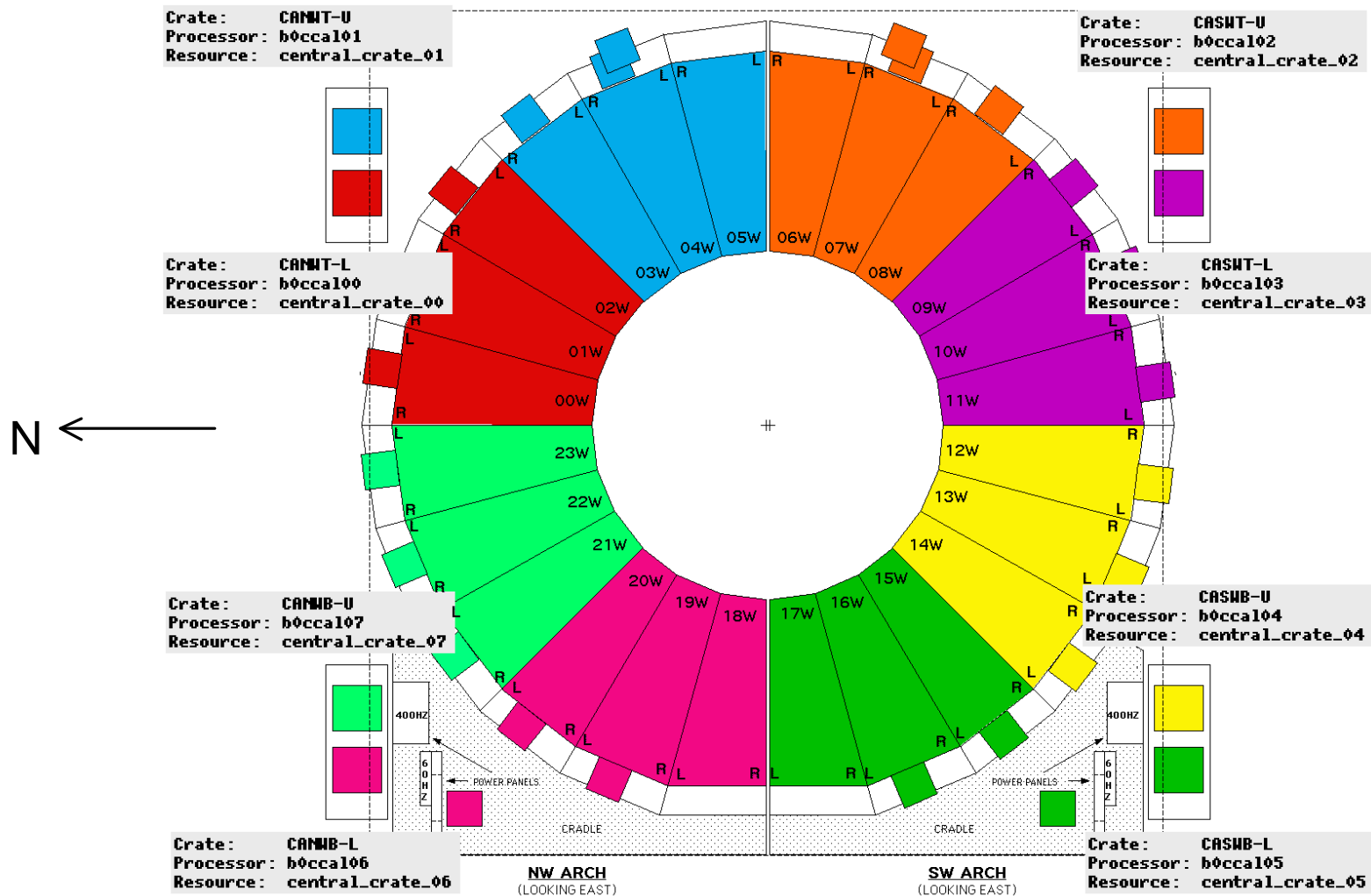
- Alphabet soup or acronym space?
 - CDF acronym dictionary on ace help page <http://www-b0.fnal.gov:8000/ace2help/aceacronyms.html>
 - All of following pictures on link on electronic logbook index page (front-end crate locations) <http://hahn.fnal.gov/decoder.html>

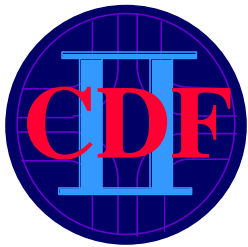


Detector Orientation

Steve Hahn
Detector
Orientation
01/15/2002

WEST CENTRAL ARCHES (LOOKING EAST)

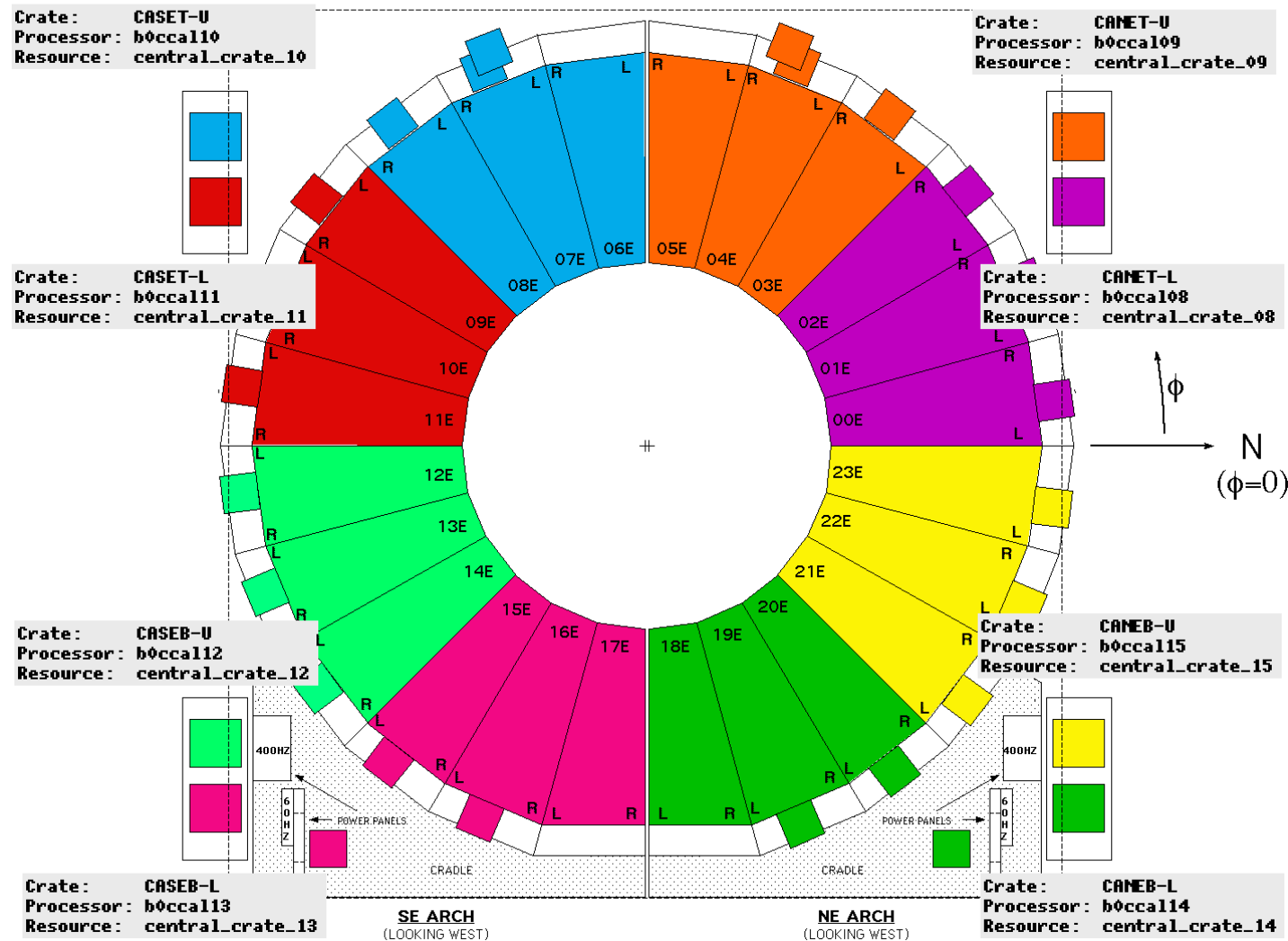


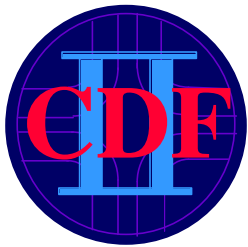


Detector Orientation

Steve Hahn
Detector
Orientation
01/15/2002

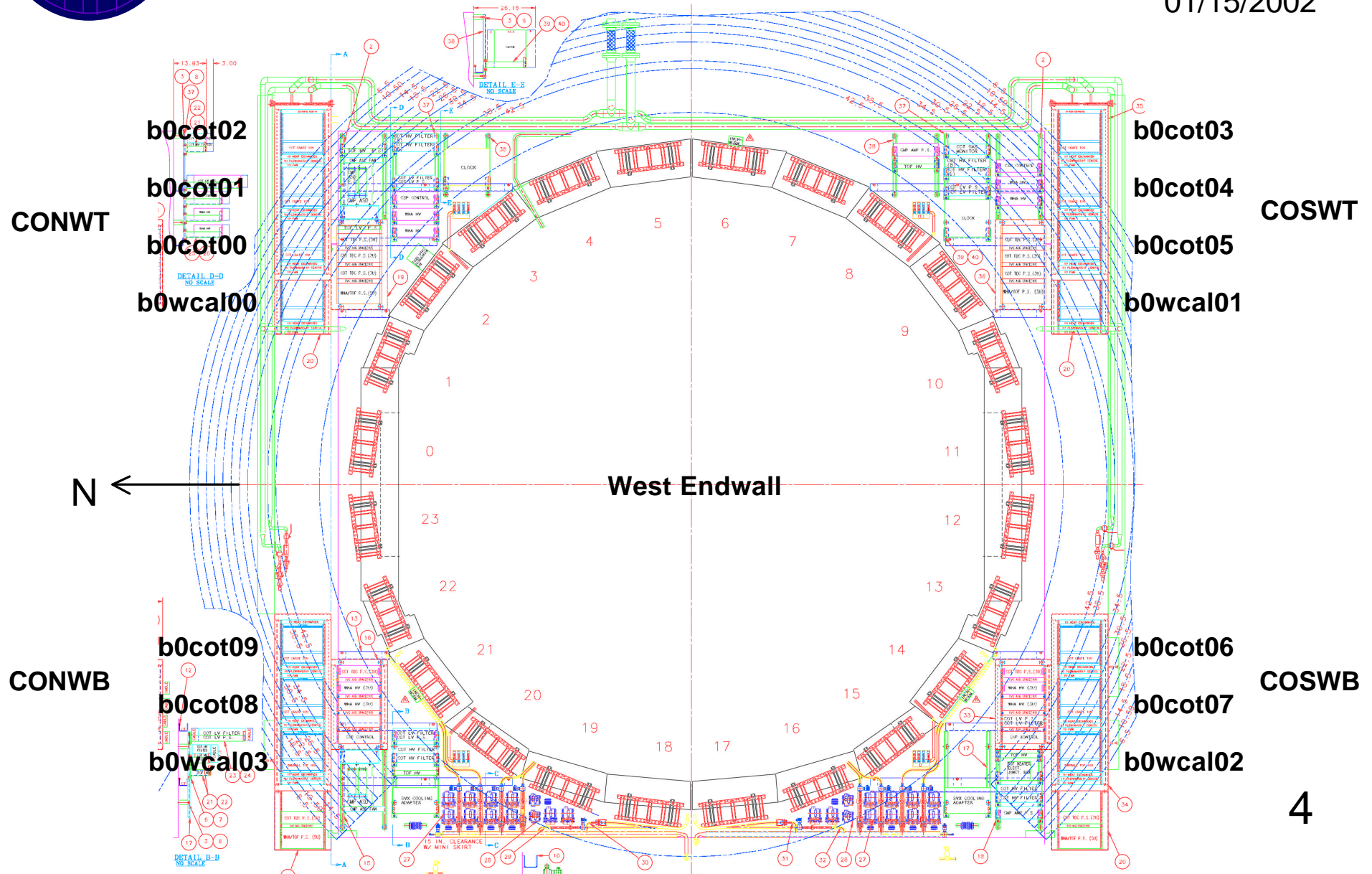
EAST CENTRAL ARCHES (LOOKING WEST)

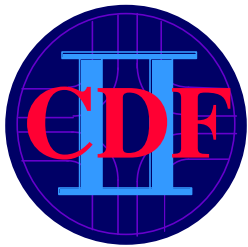




Detector Orientation

Steve Hahn
Detector
Orientation
01/15/2002





Detector Orientation

Steve Hahn
Detector
Orientation
01/15/2002

COSET

b0cot13
b0cot14
b0cot15
b0wcal05

b0cot12
b0cot11
b0cot10
b0wcal04

CONET

East Endwall

→ N

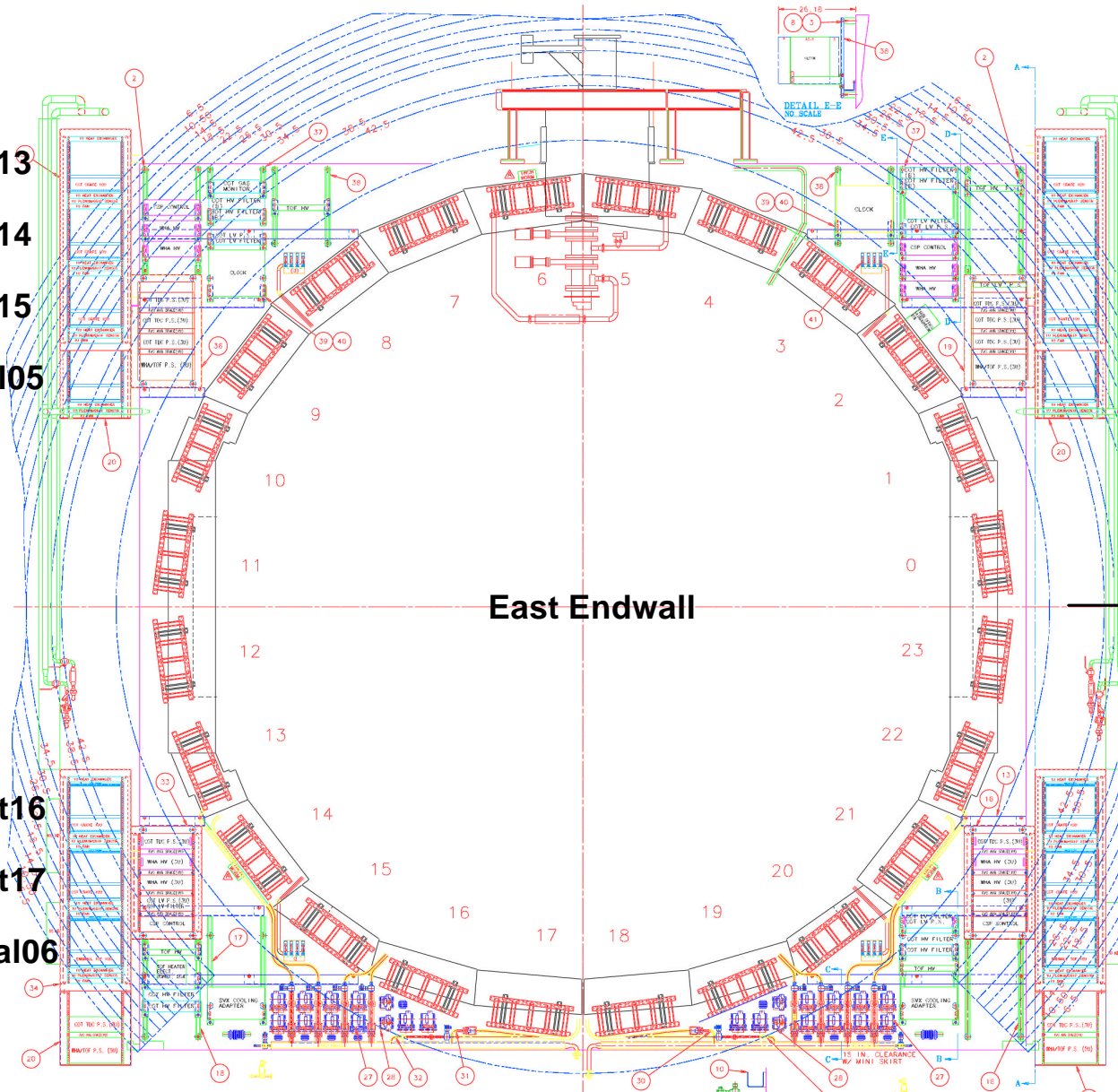
COSEB

b0cot16
b0cot17
b0wcal06

b0cot19
b0cot18
b0wcal07

CONEB

5

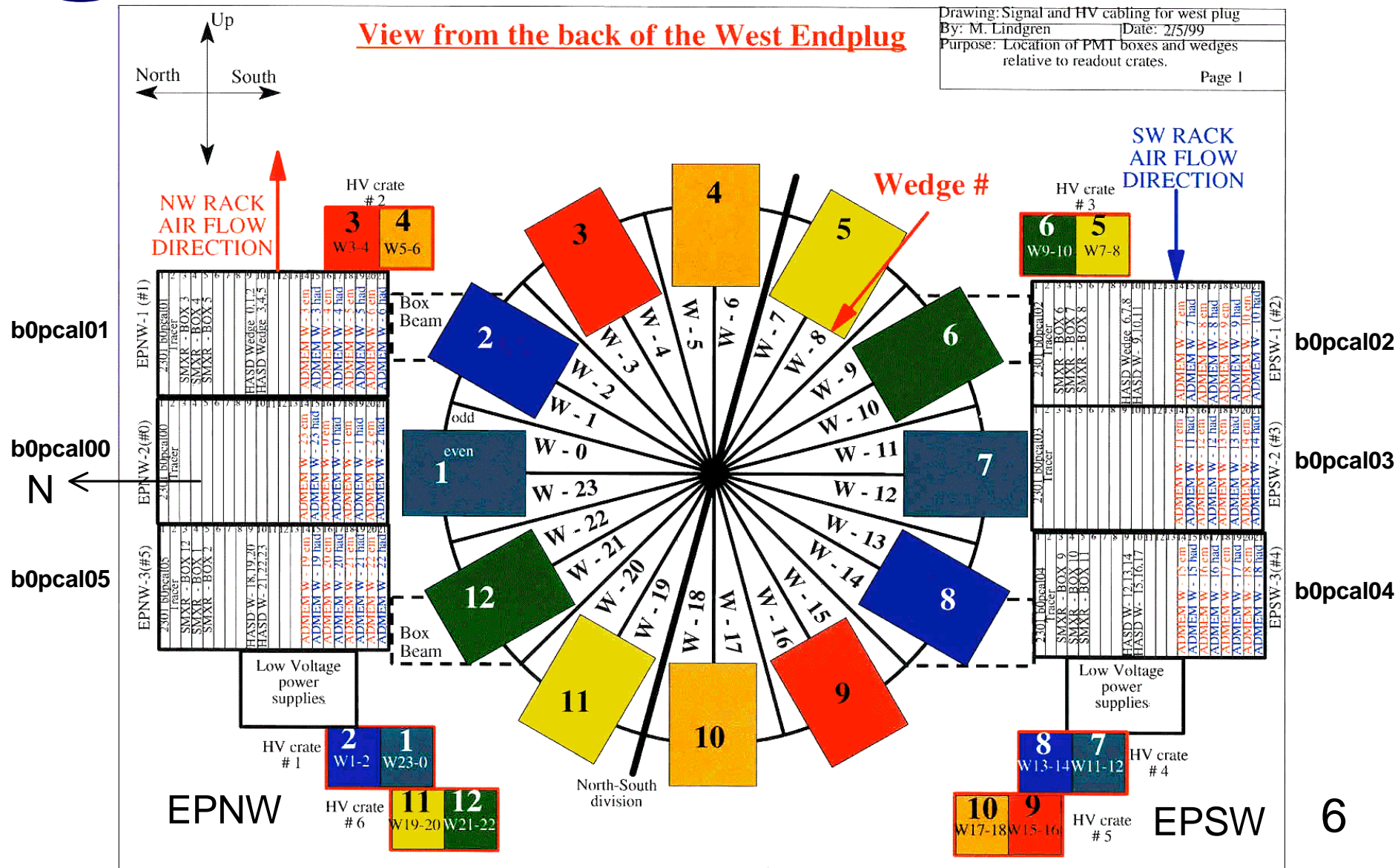


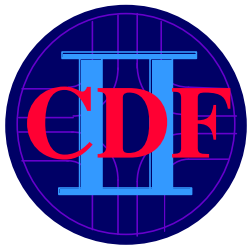


Steve Hahn
Detector
Orientation
01/15/2002

Drawing: Signal and HV cabling for west plug	
By: M. Lindgren	Date: 2/5/99
Purpose: Location of PMT boxes and wedges relative to readout crates.	

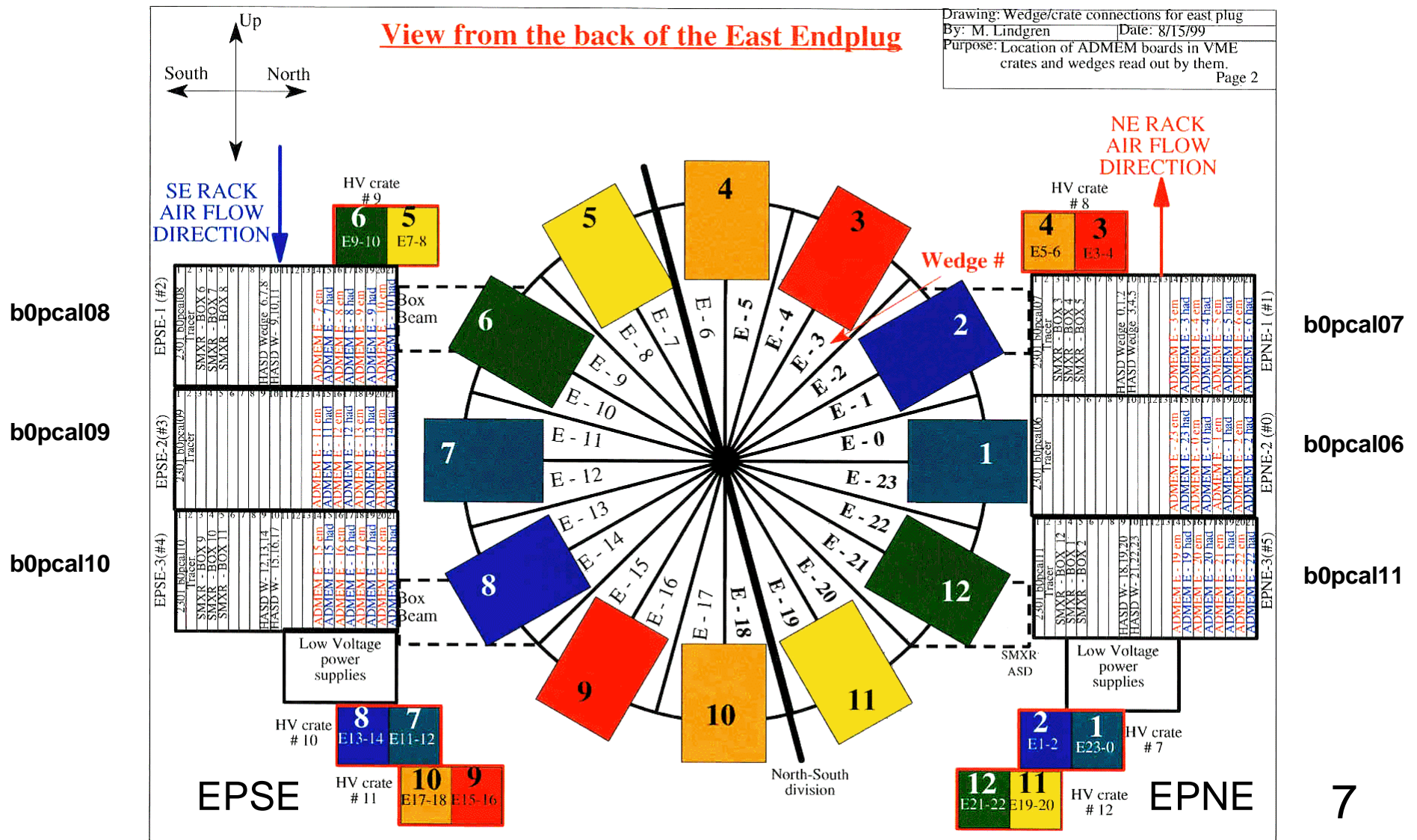
Page 1





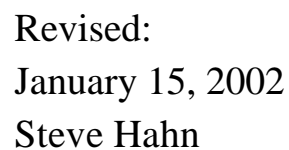
Detector Orientation

Steve Hahn
Detector
Orientation
01/15/2002



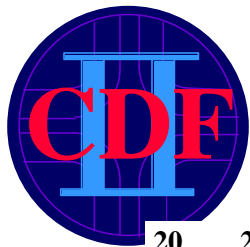


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19



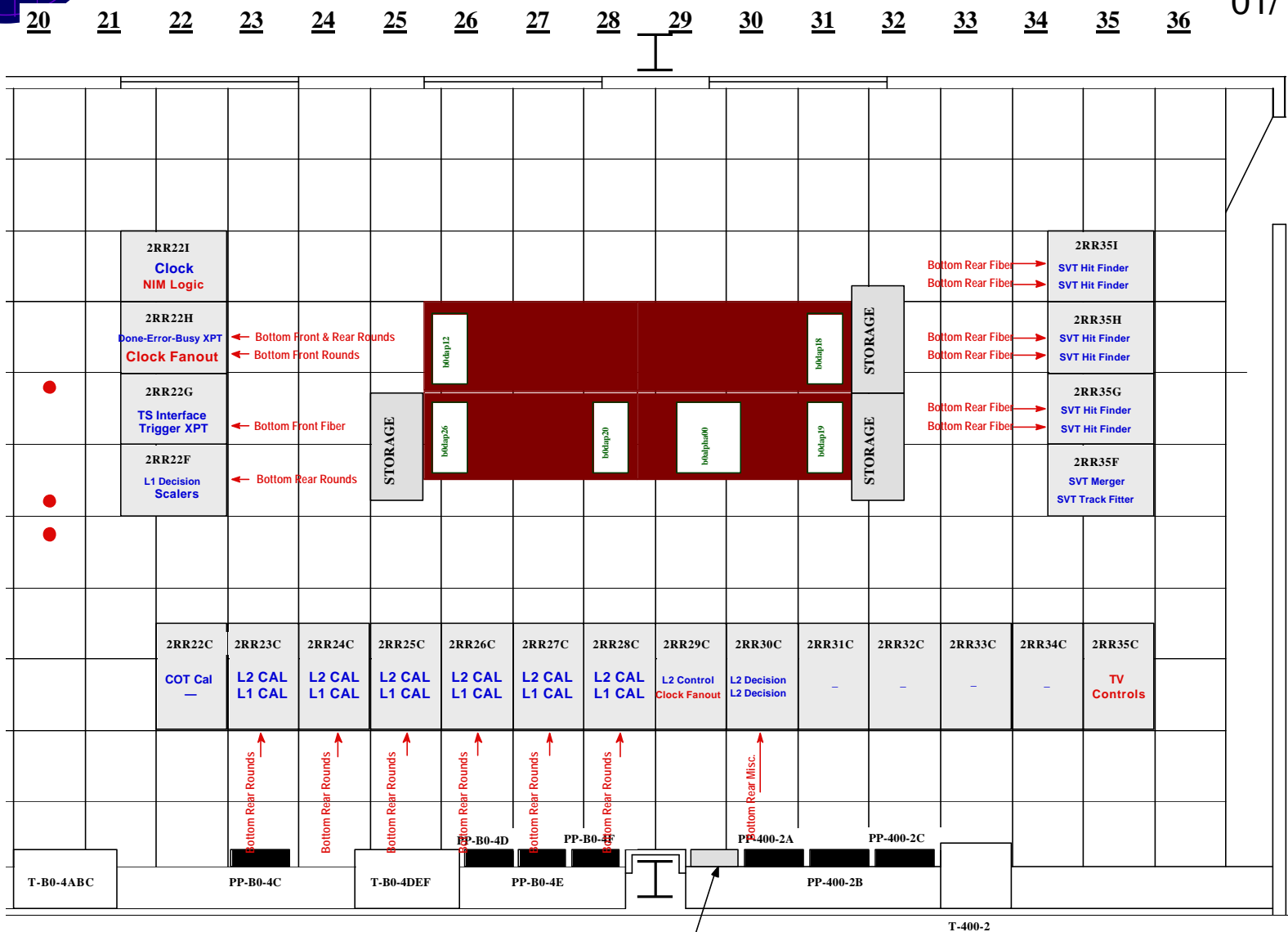
Key

- Crates using water cooling
- Crates using air cooling
- Computers with air cooling
- Temporary installations



Detector Orientation

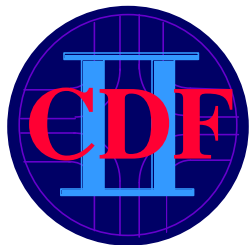
Steve Hahn
Detector
Orientation
01/15/2002



TRIGGER SYSTEM
FIRE PROTECTION PANEL

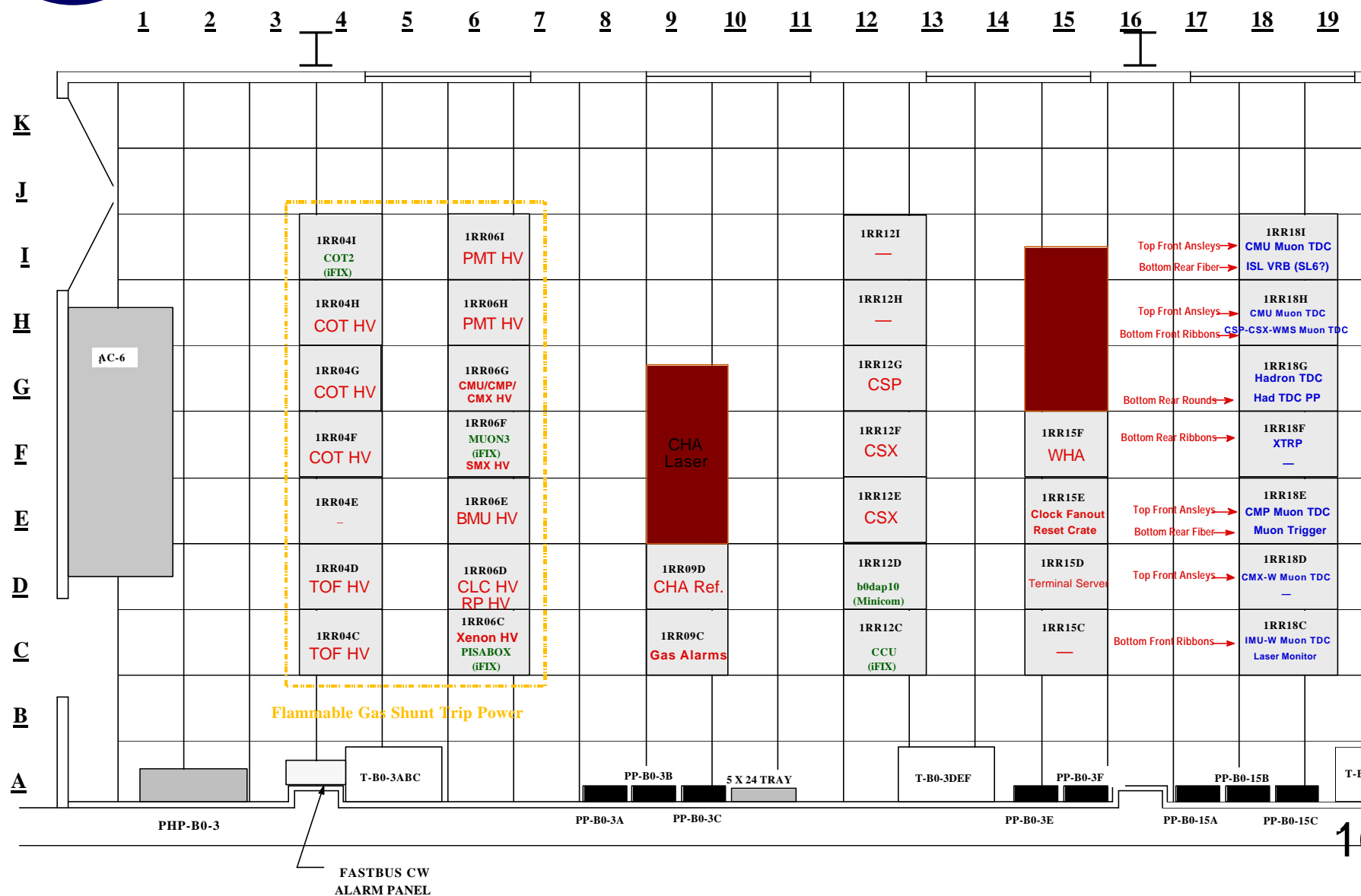
W. WICKENBERG

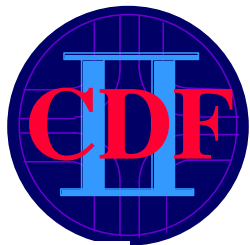
CDF RUN II
1 st & 2 nd FLOOR C.R.



Detector Orientation

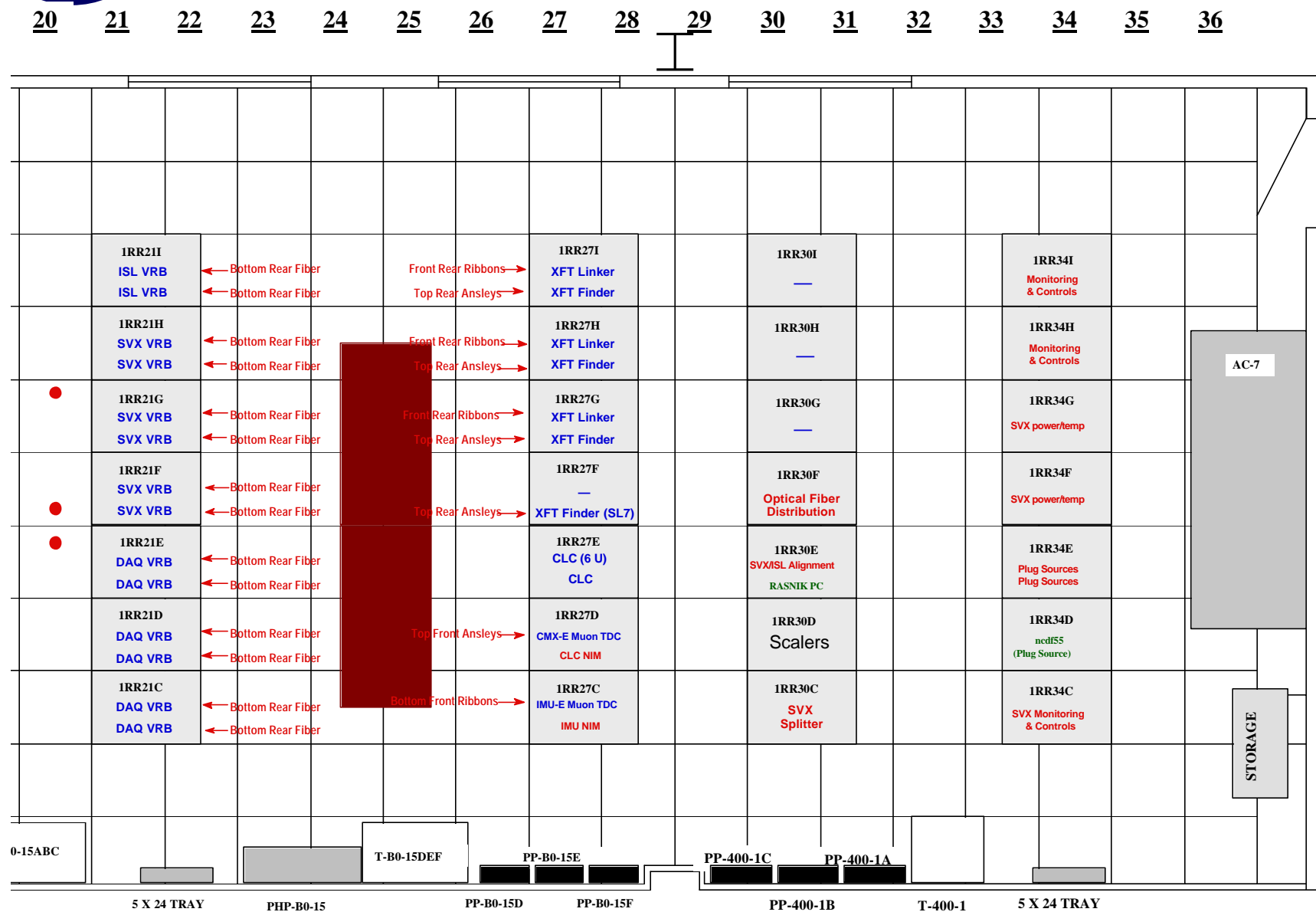
Steve Hahn
Detector
Orientation
01/15/2002





Detector Orientation

Steve Hahn
Detector
Orientation
01/15/2002



ACNET

Kevin Burkett

Ace Training
January 16, 2002

- What is ACNET
- How to Start/Run ACNET
- Navigating in ACNET
- Plotting Data in ACNET
- Downtime Logger

What is ACNET?

ACcelerator NETwork

- Developed by Fermilab Controls group
- Monitor information through accelerator
 - beam currents
 - luminosity
 - losses
- Separate devices for Tevatron, Main Injector, experiments

Starting ACNET

- ACNET runs on PC on West Side of Control Room - rack 2RR03G
- Should already be running
- Starts automatically after reboot
- If it crashes or is unresponsive

Start

- Programs
- Acnet
- Cnsrun

3 Sets of 5 Windows

- PA - Primary Applications Window
- PA: Touch Panel
- GxSA - Secondary App. Window
- GxPA:1 - Graphics Window
- GxPA:2 - Graphics Window

3 Groups - A, B, C

Additional Utilities Window

Primary Application Window

Usually Starts with Index Page

E	EXPERIMENT-RELATED PROGRAMS	◆Cmnds◆◆Pgm_Tools◆
1	24 UNUSED PARAM PAGE	47 SILICON-PARAMETERS
2	25 UNUSED PARAM PAGE	48 SVX TEST BARREL
3	26 UNUSED PARAM PAGE	49 CMP/CMX LV
4 CDF ALARMS MONITOR	27 UNUSED PARAM PAGE	50 VTX/CTC LV&TEM
5 ALARMS STARTER	28 GAMMA HI VOLTAGES	51
6 ALARM ENABLE	29 UNUSED PARAM PAGE	52 UNUSED PARAM PAGE
7	30 UNUSED PARAM PAGE	53 UNUSED PARAM PAGE
8 CDF DOWNTIME LOG	31 UNUSED PARAM PAGE	54 UNUSED PARAM PAGE
9 EXAMINE DATABASE	32 UNUSED PARAM PAGE	55
10 DEVICE LIST I/O	33 UNUSED PARAM PAGE	56 FORWARD GAS FLOW
11 E-Z WRITER	34	57
12 UNIGNORE ALARMS	35 D0 SMT LOSS MON.	58 DZERO PARAMETERS
13	36 UNUSED PARAM PAGE	59 ELECTRON COOLING
14 UNUSED PARAM PAGE	37 UNUSED PARAM PAGE	60 VTX PARAMETERS
15 UNUSED PARAM PAGE	38 UNUSED PARAM PAGE	61
16	39 UNUSED PARAM PAGE	62 B0 BACKGROUNDS
17 MONITOR	40 FMU & RPOT PISA	63 RADMON
18 ELECTRON COOL/NEF	41 E868 APEX PARAMS	64 MON STORE
19 ELECTRON COOL VAC	42 E811 PARAMETERS	65 CMP,CMX,CMU (PC1)
20 SVX LOSS MONITOR	43 CSX PISA SCINTILL	66 RPOT, FMU (PC2)
21 EXPORT MANAGER	44 E864 MINIMAX	67 FHA,PHA,FEM,PEM P3
22	45 E811 COMMANDER	68 CTC (PC4)
23 SHOW UPDATE TIMES	46 E811 ALARM DOWNLD	69 CES,CCR,CPR (PC5)

Navigating In ACNET

- You will type wherever the cursor is
- Move cursor over character where you want to type
- Left Mouse Click is like “return”
- On index pages, either click on desired page number, or type in Top Left corner
- To return to index page, type letter of desired index page in Top Left corner

Many Index Pages

B - Booster

C - Collider

D - Diagnostic / Utility

E - Experimental

I - Main Injector

L - Linac/Preacc

P - PBar

R - Recycler

T - Tevatron

Some Useful Pages

- **C65** Collider Luminosity
- **D44** Lumberjack Plotter
- **E8** Downtime Data Logger
- **E11** E-Z Writer - Good for plotting
- **E20** SVX Loss Monitor
- **E48** Silicon Alarms/Aborts
- **E64** Monitor Store

```

C65  LUMINOSITY/LOSS TOTALS          SET      D/A    A/D  Com-U  ◆COPIES◆
-<FTP>+ *SA◆ X-A/D  X=TIME          Y=C:B0SOLI,T:ERING ,C:B0Q5 ,T:IBEAMS
COMMAND ----- Eng-U  I= 0          I= 0          , 0          , 0          , 0
-< 1>+ One+ EV_DB  F= 500          F= 100000 , 1000 , 2000 , 100

C:B0PLOS      B0 Proton Losses              0      Hz
C:B0ALOS      B0 Antiproton Losses           0      Hz
C:B0ILUM      B0 Luminosity                  0      E30
C:B0TLUM      B0 Integrated Luminosity       5440    nb-1
C:B0LLUM      B0 Live Luminosity             0      E30
C:B0TLIV      B0 Live Luminosity Total       .001    nb-1
C:B0C13       Tight Min Bias Trigger         0      Hz
T:STORE       Present Store Number          567    567

!D0FLTL AND D0FZTL ARE EQUIVALENT (MDC 4/25/01)
C:D0FLTL      D0 total Fast Z Lum           0      0      0      E30
C:D0FZTL      D0 total Fast Z Lum           0      0      0      E30
C:D0PHTL      D0 total prot bunch           .282    .141    .141    Hz
C:D0AHTL      D0 total pbar bunch           .563    .563    .563    Hz

-C:FBIPNG     TFBI Prot NaroGate Inten      0      0      1E09
-C:FBIANG     TFBI Pbar NaroGate Inten      0      0      1E09

```

E11

E-Z Writer

◆Pgm_Tools◆

```

*SA◆ X-A/D  X=TIME      Y=C:B0ILUM,C:B0LLUM,C:B0TLUM,C:B0TLIV
---- Eng-U  I=    0      I=    0 ,    0 ,    50 ,    0
One+ EV_DB  F=  300      F=    5 ,    5 ,   300 ,   300

```

```

mr loss      tev loss      TEV LUM      cmuo      svx
up          down          strange      charm      bottom
e           nue           mu             numu      tau

```

```

TIME      Y=C:B0ILUM,C:B0LLUM,C:B0TLUM,C:B0TLIV
  0       I=    0 ,    0 ,    50 ,    0
 300      F=    5 ,    5 ,   300 ,   300

```

```

TIME      Y=C:LOSTP ,T:ERING ,C:B0Q5 ,T:IBEAMS
  0       I=    0 ,    0 ,    0 ,    0
 300      F= 100000 , 1000 , 2000 , 100

```

```

TIME      Y=T:IBEAMS,C:B0ILUM,C:B0Q5 ,T:ERING
  0       I=    0 ,    0 ,    0 ,    0
 300      F=    50 ,    2 , 2000 , 1000

```

```

D 77 S 67 M 77 T102 L 67 P 73 B 67 T107 M 78 C 67

```

Messages

Important quantities to Monitor/Plot in ACNET

- C:B0PLOS, C:LOSTP - B0 proton losses
- C:B0ALOS, C:LOSTPB- B0 anti-proton losses
- C:B0ILUM - B0 instantaneous luminosity
- C:B0LLUM - Live instantaneous luminosity
- C:B0TLUM - Integrated luminosity
- C:B0TLIV - Live integrated luminosity
- C:B0Q5 - Current in B0 quads
- T:ERING - Tevatron energy
- E:SVRAD(0-3)
- E:SVBLA(0,1), SVBLB(0,1)

Plotting Data

Two ways to plot:

- **Real-time plots**

- Fast-time plotter
- Accessible from E-Z Writer
- Accessible from top left corner of most pages

- **Plots of stored data**

- Lumberjack data logger
- Plot from page D44
- Devices listed on page D43
- X = Time, Y = Device

E11

E-Z Writer

◆Pgm_Tools◆

```

*SA◆ X-A/D  X=TIME      Y=E:SVRAD0,E:SVRAD1,E:SVRAD2,E:SVRAD3
---- Eng-U  I=      0      I=      0,      0.0,      0,      0
One+ EV_DB  F=  300      F=      5,      5,      5,      5

```

```

mr loss      tev loss      tev lum      cmuo      SVX
up         down      strange      charm      bottom
e          nue        mu          numu       tau

```

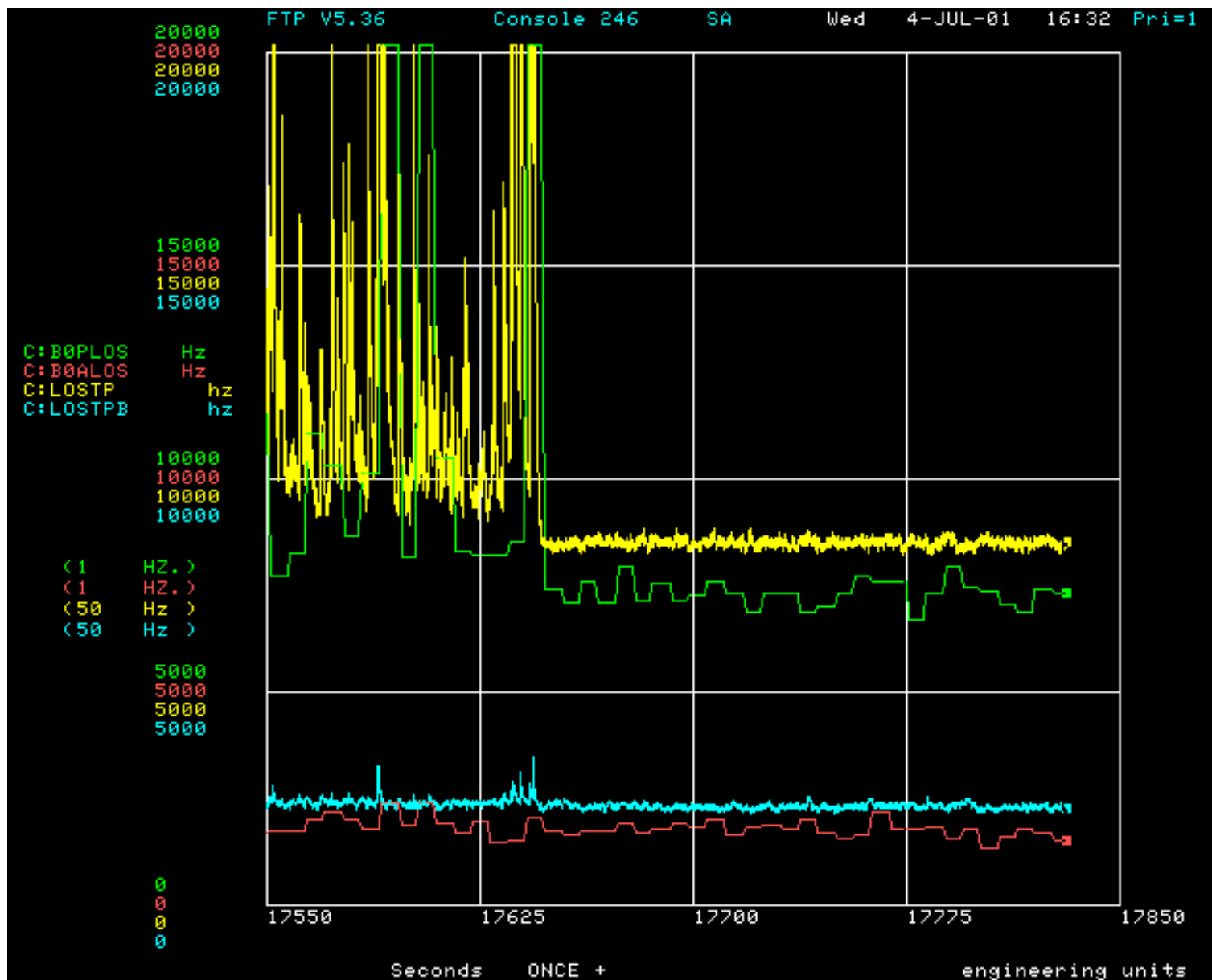
TIME	Y=E:SVRAD0,E:SVRAD1,E:SVRAD2,E:SVRAD3
0	I= 0, 0.0, 0, 0
300	F= 5, 5, 5, 5

TIME	Y=E:SVBLA1,E:SVBLA2,E:SVBLB1,E:SVBLB2
0	I= 0, 0, 0, 0
60	F= .01, .01, .01, .01

TIME	Y=T:BOLMV1,T:BOLMV2,T:BOLMAA
0	I= 1.5, 1.5, 45000,
60	F= 2.5, 2.5, 55000,

D 77 S 67 M 77 T102 L 67 P 73 B 67 T107 M 78 C 67

Messages



D44 Lumberjack Datalogger

Plot Title = ♦Shift Summary Luminosity ♦

X=TIME

Y=C:B0ILUM

,C:B0LLUM

,C:B0TLIV

,C:B0TLUM

,

I= 0

, 0

, 0

, 0

,

F= 250

, 150

, 250

, 7000

,

.CDF

.CDF

.CDF

.CDF

NONE

NONE

NONE

NONE

10082

10082

10082

10931

Read

10082

10082

10082

10931

Plotted

Y=

,

,

,

I= 0

, 0

,-10

,-10

F= 5000

, 1

, 10

, 10

.CDF

.Ctrls

.Ctrls

.Mau

NONE

NONE

NONE

NONE

Read

Plotted

T1= Mon 02-JUL-2001 00:00

T2= Mon 09-JUL-2001 00:00

♦Inc♦

♦T2 Now♦

♦Interval♦

♦Skip♦

♦X Divs 12♦

♦Interpolation♦

♦Integrate♦

♦Editor♦

♦Trace♦

♦Y Divs 10♦

♦Average♦

♦Fold♦

♦Symbol♦

♦Overwrite♦

♦Previous♦

♦Next♦

♦StdDev♦

♦LJScanJob♦

♦Recall♦

♦Save♦

♦Fit Equations♦

Data Source ♦CDF (Cns45)♦

♦List Data♦

♦Copy♦

♦Min/Max♦

♦All Device Plot♦List = ♦ 3♦

♦Export Data♦

♦Enable♦

♦Calc Points♦

Messages

CNS 246, node=48, record # 32 - saved

CNS 246, node=48, record # 31 - recalled

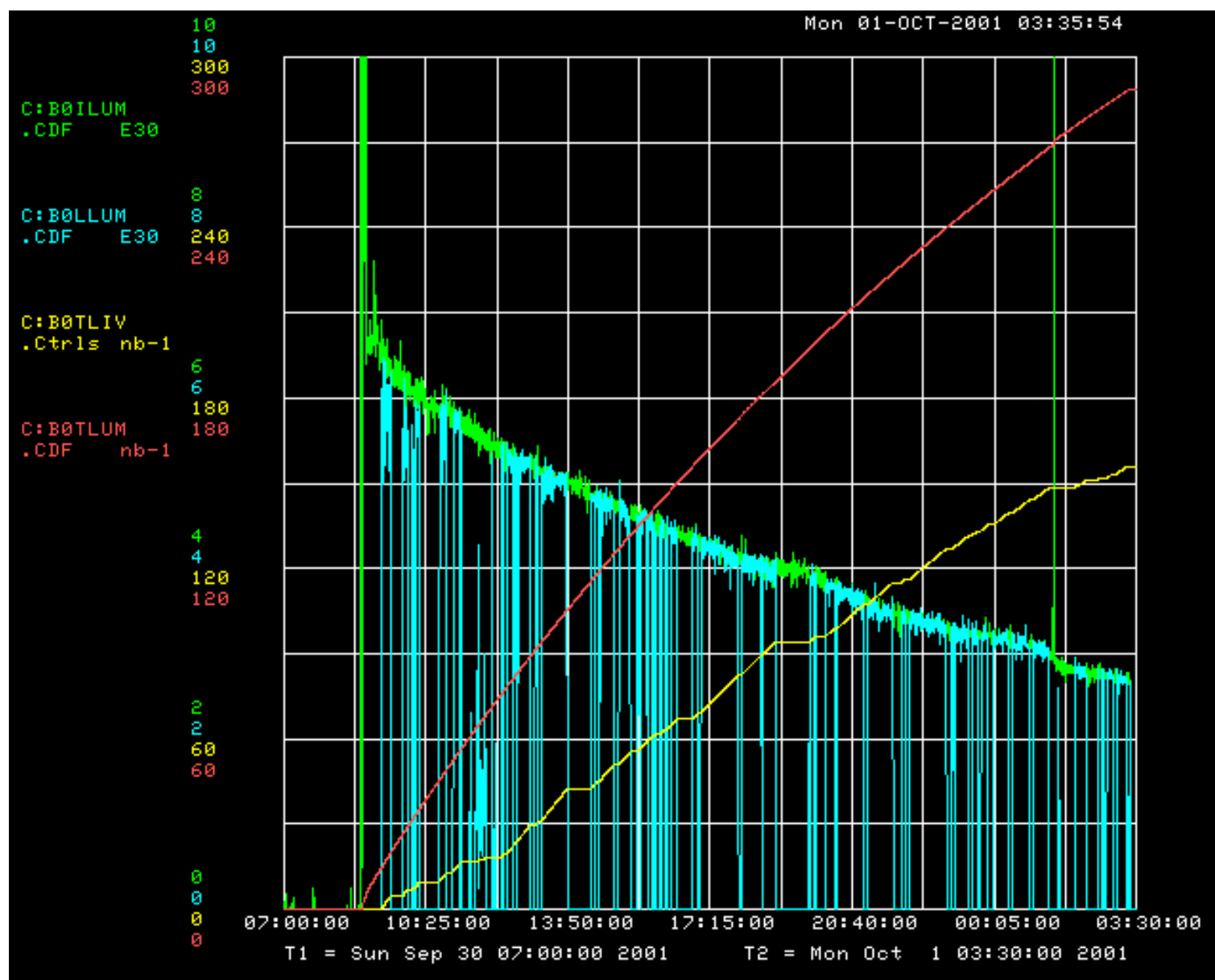
CNS 246, node=48, - console restored

1:3 of 5

p

n

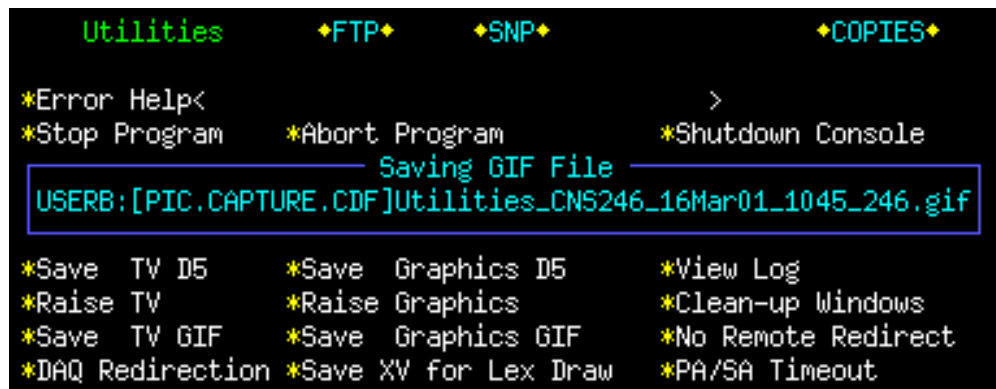
+



End of Shift Summary

Want summary of luminosity, svx rads in e-log

- Should have lumberjack plots already formatted
- Use RECALL to bring up saved format
- Save file to disk (save as gif)
 - Use utilities window
 - Save to gif
 - Save in [PIC.CAPTURE.CDF]
- Import to e-log



```
Utilities      ♦FTP♦      ♦SNP♦      ♦COPIES♦

*Error Help<                                     >
*Stop Program      *Abort Program      *Shutdown Console

Saving GIF File
USERB:[PIC.CAPTURE.CDF]Utilities_CNS246_16Mar01_1045_246.gif

*Save TV D5      *Save Graphics D5      *View Log
*Raise TV      *Raise Graphics      *Clean-up Windows
*Save TV GIF      *Save Graphics GIF      *No Remote Redirect
*DAQ Redirection *Save XV for Lex Draw      *PA/SA Timeout
```

Downtime Data Logger

Page E8

- When data-taking stops for more than ~ 2 minutes, an entry is generated automatically
- Shift crew must edit to categorize downtime
 - HV
 - DAQ
 - Trigger
 - Level3
 - etc, etc
- Allows for downtime accounting later

CDF Downtime Logger - page E8

E8 Downtime Log Entry And Edit ◆Pgm_Tools◆

◆Command◆ ◆Auto Entry◆ ◆Statistics◆ ◆Plot◆ ◆Manager Functions◆

-<28-OCT-2001>+ 28-OCT-01 08:48:19

◆Mail◆ Down Time Log ◆Find◆

From 30-SEP-2001 12:06 To 07-OCT-2001 01:15

Dn	Up	System	Mode	Description of Problem
06-OCT-2001 Saturday				
0527	0531	TEVSTUD	H	flying wire
0558	0613	TRIGLVL2	H	l2 studies
0614	0623	TRIGLVL2	H	l2 studies
0627	0632	TEVSTUD	H	flying wire
0647	0656	TRIGLVL2	H	l2 studies
0659	0703	TRIGLVL2	H	l2 studies
0705	0715	NOCATEG	H	b0svx07 gave BT0
0727	0731	TEVSTUD	H	flying wire
1247	1251	TEVSTUD	H	flying wire
2255	2305	SCRAPERS	H	scrapping
2307	2311	SCRAPERS	H	scrapping
2347	2352	TEVSTUD	H	flying wire
07-OCT-2001 Sunday				
0035	0039	DAQOTHR	H	busy timeout
0048	0053	TEVSTUD	H	flying wire
0058	0102	COT HV	H	COT trip in SL7
=>0115	0145	FEVME	H	fib03 problem followed by CMP HV setting change

90:106 of 106

Messages

Click AUTO ENTRY to bring up pending entries

E8 Downtime Log Entry And Edit ◆Pgm_Tools◆

◆Command◆ ◆Auto Entry◆ ◆Statistics◆ ◆Plot◆ ◆Manager Functions◆

-<28-OCT-2001>+ 28-OCT-01 08:48:46 ◆Find◆

◆Mail◆ Down Time Log

Dn	Up	System	Mode	Description of Problem
06-OCT-2001 Saturday				
0527	0531	TEVSTUD	H	flying wire
0558	0613	TRIGLVL2	H	l2 studies
0614	0623	TRIGLVL2	H	l2 studies
0627	0632	TEVSTUD	H	flying wire
0647	0656	TRIGLVL2	H	l2 studies
0659	0703	TRIGLVL		
0705	0715	NOCATEG		
0727	0731	TEVSTUD		
1247	1251	TEVSTUD		
2255	2305	SCRAPER		
2307	2311	SCRAPERS	H	scraping
2347	2352	TEVSTUD	H	flying wire
07-OCT-2001 Sunday				
0035	0039	DAQOTHR	H	busy timeout
0048	0053	TEVSTUD	H	flying wire
0058	0102	COT HV	H	COT trip in SL7
=>0115	0145	FEVME	H	fib03 problem followed by CMP HV setting change

90:106 of 106

Messages

◆Add◆ ◆Delete◆ ◆Quit◆

Recorded DT

Down Time Up Time

11-OCT-2001 09:14 11-OCT-2001 10:10

Click **ADD** and then choose an entry from the list

E8 Downtime Log Entry And Edit Pgm_Tools

Command Auto Entry Statistics Plot Manager Functions

Save Now Pend New Entry Quit

down:11-OCT-2001 0914 up:11-OCT-2001 1010 Downtime <PENDING> Name_Help 6

Dn	Up	System	Mode	Description of Problem
06-OCT-2001 Saturday				
0527	0531	TEVSTUD	H	flying wire
0558	0613	TRIGLVL2	H	l2 studies
0614	0623	TRIGLVL2	H	l2 studies
0627	0632	TEVSTUD	H	flying wire
0647	0656	TRIGLVL2	H	l2 studies
0659	0703	TRIGLVL2	H	l2 studies
0705	0715	NOCATEG	H	b0svx07 gave BT0
0727	0731	TEVSTUD	H	flying wire
1247	1251	TEVSTUD	H	flying wire
2255	2305	SCRAPERS	H	scrapping
2307	2311	SCRAPERS	H	scrapping
2347	2352	TEVSTUD	H	flying wire
07-OCT-2001 Sunday				
0035	0039	DAQOTHR	H	busy timeout
0048	0053	TEVSTUD	H	flying wire
0058	0102	COT HV	H	COT trip in SL7
=>0115	0145	FEVME	H	fib03 problem followed by CMP HV setting change

90:106 of 106

Messages

Click NAME HELP to get a list of major categories

Click on category to get a list of sub-categories

E8 Downtime Log Entry And Edit ◆Pgm_Tools◆

◆Command◆ ◆Auto Entry◆ ◆Statistics◆ ◆Plot◆ ◆Manager Functions◆

◆Save◆ ◆Now◆ ◆Pend◆ New Entry ◆Quit◆

down:11-OCT-2001 0914 up:11-OCT-2001 1010 Downtime < >◆Name_Help◆ 6

Dn	Up	System Mode	Description of Problem
06-OCT-2001		Saturday	
0527	0531	TEVSTUD	H flying wire
0558	061		Pick a group please...
0614	062	ACCELERATOR	
0627	063	DATA ACQUISITION	
0647	065	GAS PROBLEMS	
0659	070	HIGH VOLTAGE	
0705	071	MAGNETS	
0727	073	OPERATION	
1247	125	TRIGGER	
2255	230	CALIBRATION	
2307	231	MISCELLANEOUS	
2347	235	COMMENTS	
07-OCT-200		TESTS	
0035	003		
0048	0053	TEVSTUD	H flying wire
0058	0102	COT HV	H COT trip in SL7
=>0115	0145	FEVME	H fib03 problem followed by CMP HV setting change

90:106 of 106

Messages

Possible categories under ACCELERATOR

Click on one to copy it to DOWNTIME field

E8 Downtime Log Entry And Edit ◆Pgm_Tools◆

◆Command◆ ◆Auto Entry◆ ◆Statistics◆ ◆Plot◆ ◆Manager Functions◆

◆Save◆ ◆Now◆ ◆Pend◆ New Entry ◆Quit◆

down:11-OCT-2001 0914 up:11-OCT-2001 1010 Downtime < >◆Name_Help◆ 6

Dn	Up	System Mode	Description of Problem
06-OCT-2001		Saturday	
0527	0531	TEVSTUD	H flying wire
0558	061		Pick a group please...
0614	062	ACCELERATOR	
0627	063	DATA ACQUISITION	
06		ACCEL	
06		MRLOSS	main ring losses
07		TEVLOSS	tevatron losses
07		SCRAPERS	waiting for stable beam
12		TEVSTUD	Tevatron Studies
22			
2307	231	MISCELLANEOUS	
2347	235	COMMENTS	
07-OCT-200		TESTS	
0035	003		
0048	0053	TEVSTUD	H flying wire
0058	0102	COT HV	H COT trip in SL7
=>0115	0145	FEVME	H fib03 problem followed by CMP HV setting change

90:106 of 106

Messages

Possible categories under HV

Click on one to copy it to DOWNTIME field

E8 Downtime Log Entry And Edit Pgm_Tools

Command Auto Entry Statistics Plot Manager Functions

Save HV t

down PEM HV plug e-m high voltage p 6

PHA HV plug hadron high voltage

FEM HV forward e-m high voltage p

Dn FHA HV forward hadron high voltage

06-0 CES HV central strip high voltage

05 VTPC HV vertex TPC high voltage

05 CMU HV central muon high voltage

06 CDT HV central drift tubes high voltage

06 COT HV central tracking chamber high voltage

06 FTC HV forward tracking chamber high voltage

06 IMU HV forward muon high voltage

07 ALL HV turn on/off HV

07 SVX HV silicon vertex detector voltage

12 CPR HV central prevadiator high voltage

22 CMX HV muon extension high voltage

23 CMP HV central muon upgrade high voltage

23 HVCNTRL HV control problems

07-0 CCAL HV Central cal HV

00 PCAL HV Plug cal HV

00 BMU HV Barrel muon HV

00 ISL HV Intermediate silicon HV

=>01 CLC HV Luminosity counter HV

BSC HV Beam shower counter HV

TOF HV Time-of-flight HV

n

+

Type in comment and then click SAVE to commit new entry

E8 Downtime Log Entry And Edit Pgm_Tools

Command Auto Entry Statistics Plot Manager Functions

Save Now Pend New Entry Quit

down:11-OCT-2001 0914 up:11-OCT-2001 1010 Downtime <COT HV >Name_Help 6

type the comment explaining the downtime here

Dn	Up	System	Mode	Description of Problem
06-OCT-2001 Saturday				
0527	0531	TEVSTUD	H	flying wire
0558	0613	TRIGLVL2	H	l2 studies
0614	0623	TRIGLVL2	H	l2 studies
0627	0632	TEVSTUD	H	flying wire
0647	0656	TRIGLVL2	H	l2 studies
0659	0703	TRIGLVL2	H	l2 studies
0705	0715	NOCATEG	H	b0svx07 gave BT0
0727	0731	TEVSTUD	H	flying wire
1247	1251	TEVSTUD	H	flying wire
2255	2305	SCRAPERS	H	scrapping
2307	2311	SCRAPERS	H	scrapping
2347	2352	TEVSTUD	H	flying wire
07-OCT-2001 Sunday				
0035	0039	DAQOTHR	H	busy timeout
0048	0053	TEVSTUD	H	flying wire
0058	0102	COT HV	H	COT trip in SL7
=>0115	0145	FEVME	H	fib03 problem followed by CMP HV setting change

90:106 of 106

Messages

When a new store goes in, enter STORE COMMENT
Not an auto entry, so use Add Entry

E8 Downtime Log Entry And Edit Pgm_Tools

Command Auto Entry Statistics Plot Manager Functions

Save Now Pend New Entry Quit

down:15-JAN-2002 1619 up:dd-mm-yyyy hhmm Downtime < >Name_Help 1

p

Dn	Up	System Mode	Description of Problem
14-JAN-2002	Monday	2214 2217 CMU HV H PENDING	
=>2222	225		Pick a group please...
2341	234	ACCELERATOR	
2346	235	DATA ACQUISITION	

15-J COMMENTS

00	STORE	Store info. down = time at low beta. up = end store
00	STORCOM	Store comments.
00	STRSHFT	Start shift; crew list
01	ENDSHFT	End shift; Coopump, CDFump, downtime, beamtime
=>02	NOTES	notes for record
03		

0341 035 COMMENTS

0424 042 TESTS

0442 045

0501 0505 HVCNTRL H cmp cmx trip

0505 0511 HVCNTRL H cmp trip

=>0613 0633 HVCNTRL H cmp cmx trip

89:105 of 105

Messages

n

DOWN time is when scraping complete - fill UP time at end of store
Comment should include store # and initial luminosity

E8 Downtime Log Entry And Edit ◆Pgm_Tools◆

◆Command◆ ◆Auto Entry◆ ◆Statistics◆ ◆Plot◆ ◆Manager Functions◆

◆Save◆ ◆Now◆ ◆Pend◆ ◆New Entry◆ ◆Quit◆

down:15-JAN-2002 1619 up:dd-mm-yyyy hhmm Downtime <STORE >◆Name_Help◆ 1

Store 999 - initial lum 1.5E31

Dn	Up	System	Mode	Description of Problem
14-JAN-2002 Monday				
2214	2217	CMU HV	H	PENDING
=>2222	2255	NOCATEG	H	
2341	2345	CMU HV	H	
2346	2356	TRIGLVL2	H L2 Done	timeout
15-JAN-2002 Tuesday				
0012	0018	HVCNTRL	H	cmp,cmx trip
0025	0029	HVCNTRL	H	CMX, CMP trips
0031	0050	HVCNTRL	H	CMX, CMP trips due to high losses
0103	0120	STARTUP	H	starting new run
=>0237	0259	STARTUP	H	starting new run in order to include muon
0319	0330	HVCNTRL	H	CMP CMX trip
0341	0351	STARTUP	H	starting new run in order to include silicon
0424	0429	HVCNTRL	H	cmx cmp trip
0442	0452	STARTUP	H	new run startup
0501	0505	HVCNTRL	H	cmp cmx trip
0505	0511	HVCNTRL	H	cmx trip
=>0613	0633	HVCNTRL	H	cmp cmx trip

89:105 of 105

Messages

More Documentation

- **Web Tutorials by John Yoh, et al.**
 - www-b0.fnal.gov:8000/acnet/acnet.html
 - 4 different tutorials here plus 3 other useful links
- **Aces' Shift ACNET Plots**
 - www-b0.fnal.gov:8000/acnetplots/acnet.html -
- **Accelerator Division Web Pages**
 - www-bd.fnal.gov/acnet/
 - Information about all acnet pages
- **Ask the operations manager**

Shot Setup

Jay R. Dittmann

CDF Ace Training

March 27, 2002

Beamspeak:

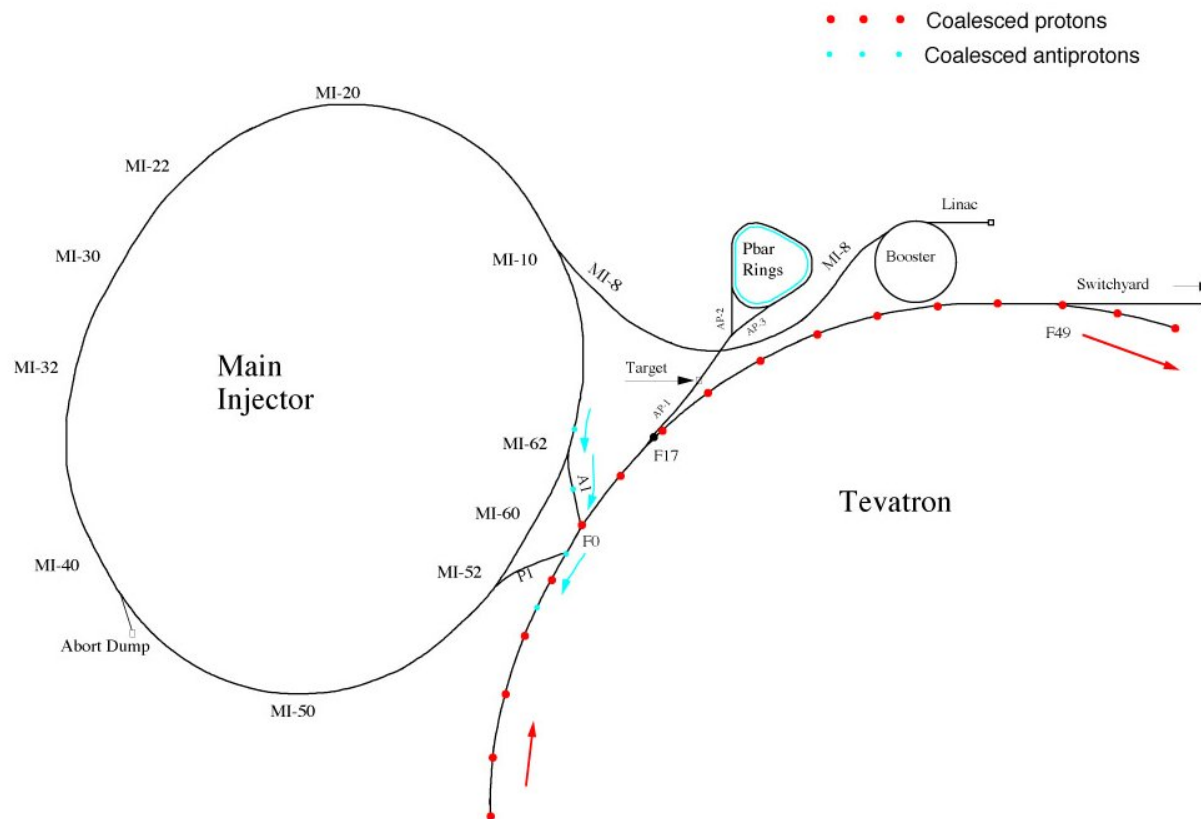
- *Store* — period during which a steady particle beam is present in the Tevatron
 - usually means both protons and antiprotons are present
 - are numbered sequentially
 - can last from minutes to hours to days
 - can sometimes end abruptly

Beamspeak:

(continued)

- *Shot* — the injection of antiprotons from the Accumulator into the Main Injector and on into the Tevatron in preparation for colliding beams operation
- *Shot Setup* — the sequence of events leading to antiproton shots

The Fermilab Accelerator Chain



Shot Setup at CDF — Overview

At the end of the previous store:

- finish the data-taking run
- before previous store is dumped, ramp down HV (allow 5 minutes)

The Main Control Room (MCR) should notify CDF in advance of planned beam dumps.

Shot Setup at CDF — Overview

Between one store and the next:

- Assume sufficient pbars to shoot again
- Time between shots:
 - currently 2-3 hours (on a good day)
 - Beams Division aims to reduce the time to 1 hour
- Calibrations (Quiet Time?)

Shot Setup at CDF — Overview

Beginning the next store:

- Protons are injected first, then pbars
- Accelerate beams to 980 GeV
- Cogging
- Low Beta Squeeze
- Scraping

Once losses are low and the beam is stable, Ramp HV and begin taking data.

Shot Setup at CDF — More detail

- *Injection* — the process of transferring protons or antiprotons from the Main Injector to the Tevatron (4 bunches at a time)
- *Ramping* — the magnetic fields of the magnets are increased simultaneously, boosting proton/pbar energies from 150 GeV to 980 GeV ("flat top")

Shot Setup at CDF — More detail

- *Cogging* — the process of spacing bunches of protons or pbars in the Tevatron so that they will collide at the proper points in the ring
- *Low beta squeeze* — after injecting protons and pbars into the Tevatron, a special set of quadrupoles (“low beta quads”) are turned on at BO to reduce the size of the beam and increase luminosity
- *Scraping* — using collimators to remove the beam “halo” and reduce losses

MCR will notify CDF when scraping is complete!

Shot Setup — What to watch in ACNET

A shot is going in...

- C:BOPLoS – BO proton losses from BSC (Hz)
- C:BOALoS – BO antiproton losses from BSC (Hz)
- C:LOSTP – Proton losses – fast response (Hz)
- C:LOSTPB – Antiproton losses – fast response (Hz)
- C:BOILUM – BO delivered instantaneous luminosity ($\text{E30 cm}^{-1} \text{ s}^{-1}$)
- C:BOQ5 – Current in BO low beta quads (amps)
- T: ERING – Tevatron energy (GeV)
- T: IBEAM – Tevatron beam current (E12)
- E: SVRAD(O-3) – SVX integrated radiation dose (rad)
- E: SVBLA(O,1), SVBLB(O,1) – SVX rad instantaneous rates (rad/s)

During store, also monitor...

- C:BOILUM – BO delivered instantaneous luminosity ($\text{E30 cm}^{-1} \text{ s}^{-1}$)
- C:BOLLUM – BO live instantaneous luminosity ($\text{E30 cm}^{-1} \text{ s}^{-1}$)
- C:BOTLUM – integrated delivered luminosity (nb^{-1})
- C:BOTLIV – integrated live luminosity (nb^{-1})

Example: Shot setup on April 1, 2001 — proton only

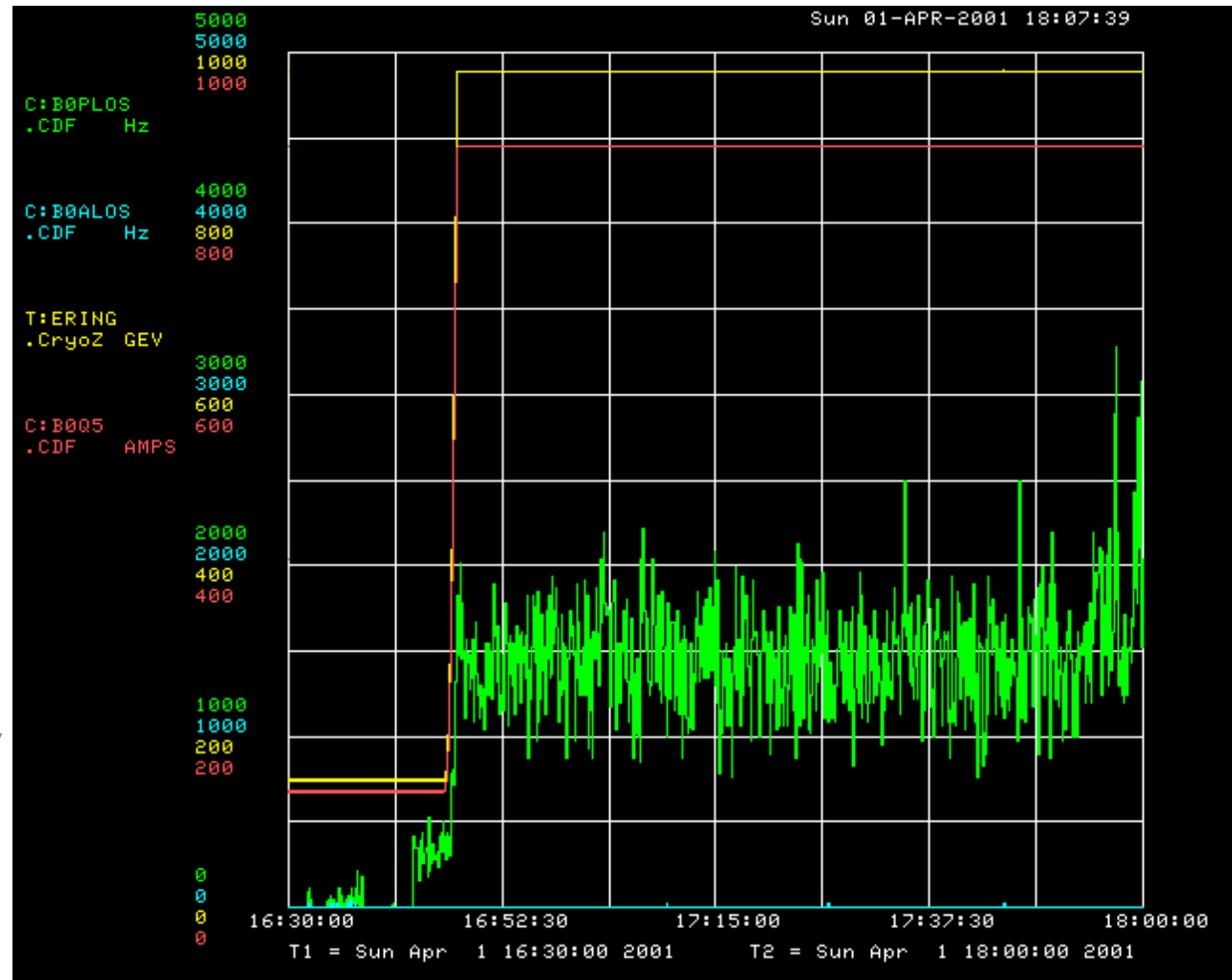
C:B0PLOS

C:B0ALOS

T:ERING

C:B0Q5

**Use ACNET
page E11
(E-Z Writer)
to create**



Shot Setup

CDF Ace Training, 3/27/2002 J. Dittmann

11

Example: Shot setup on July 7, 2001 (Evening shift) (TeV store 567)

Start Shift **Make Entry** **End Shift** **Prev** **Next** **Latest** **Contents** **Search** **Add Graph**
Multi-Shift **Fix List** **Home**

[Sat Jul 7 18:25:41](#)
Protons in TeV. First set of pbars in. [- Tom LeCompte](#)

[Sat Jul 7 18:26:35](#)
PSM alarm from 2RR30C_2. They are working on the this crate, so I don't worry. However, whilst trying to look at the PSM pages I gets lots of IFIX errors and then IFIX kills itself. I restart it following the instructions in the white folder.
Once IFIX is restarted I try to look at the PSM pages again. I can see them, but I still get IFIX errors. - [Victoria](#)

[Sat Jul 7 18:29:54](#) The COT was OFF, now it's in low standby.
Mike has put the TOF on. - [Victoria](#)

[Sat Jul 7 18:54:35](#) Protons and pbars in at 150 GeV. - [TJL](#)

[Sat Jul 7 18:56:07](#) TeV at 980 GeV. - [TJL](#)

[Sat Jul 7 19:03:10](#)
New trigger table test without beam:
▪ Physics_0_00[2,158] tested in run 119607 (2k evts) looks ok
▪ Physics_I_0_00[1,159] tested in run 119608 (1k evts) looks ok
▪ Physics_D_0_00[5,160] tested in run 119609 (1k events) looks ok
All those tests ended to be useless as Farrukh found out that from the guilty parties that they didn't gave him the right set of corrections. Have to do it all again!
- [Anyes](#)
-- [Sat Jul 7 20:28:42 comment by...Anyes](#) --
Farrukh has disable those tables since there are useless. Will need to restart RC.

[Sat Jul 7 19:03:25](#) Squeeze completed. Pbar losses ~20 KHz, P losses ~15 kHz. - [TJL](#)

Example: Shot setup on July 7, 2001 (Evening shift)
(TeV store 567)

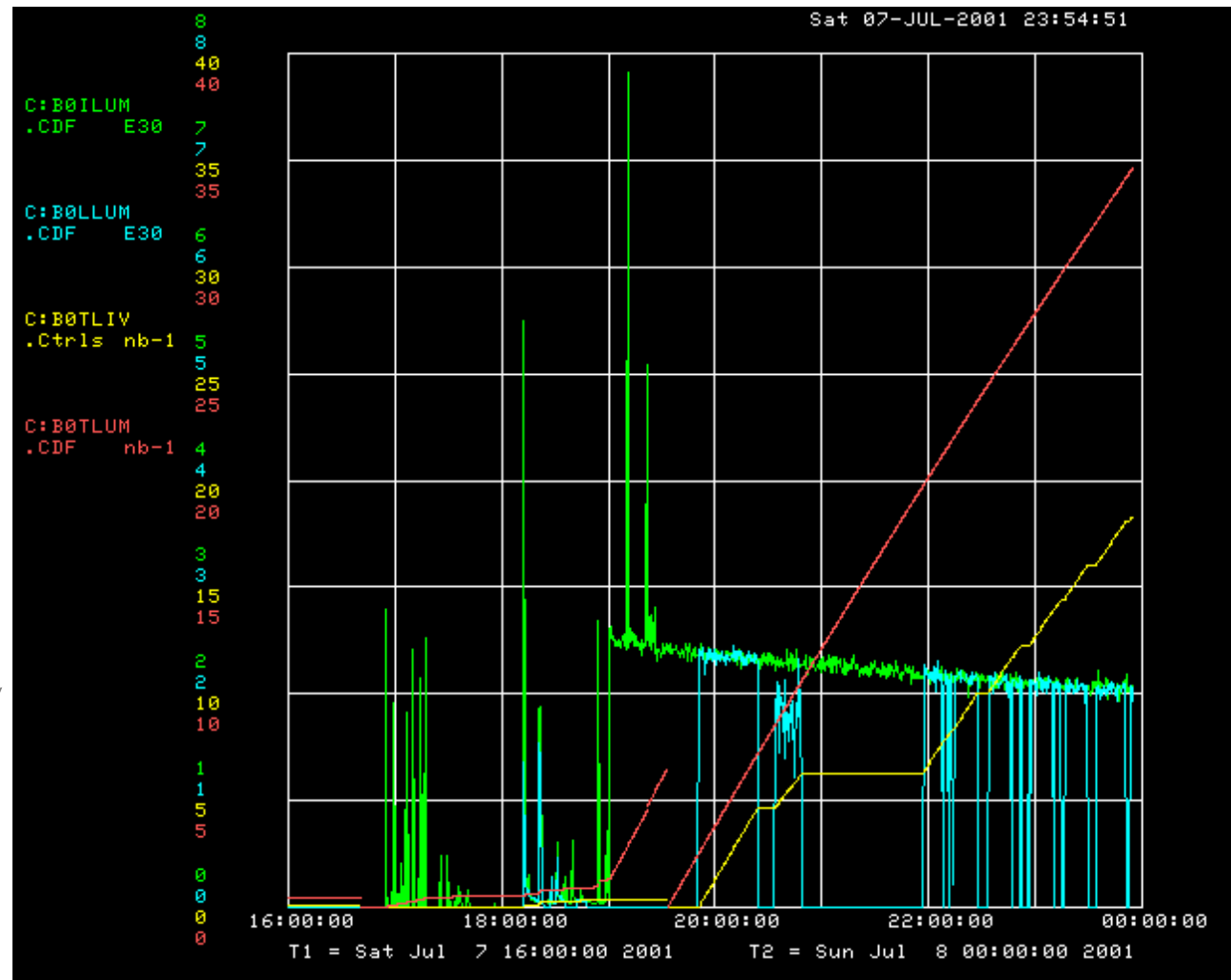
C:BOILUM

C:BOLLUM

C:BOTLIV

C:BOTLUM

**Use ACNET
page E11
(E-Z Writer)
to create**



Shot Setup

CDF Ace Training, 3/27/2002 J. Dittmann

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Example: Shot setup on July 7, 2001 (Evening shift)
(TeV store 567)

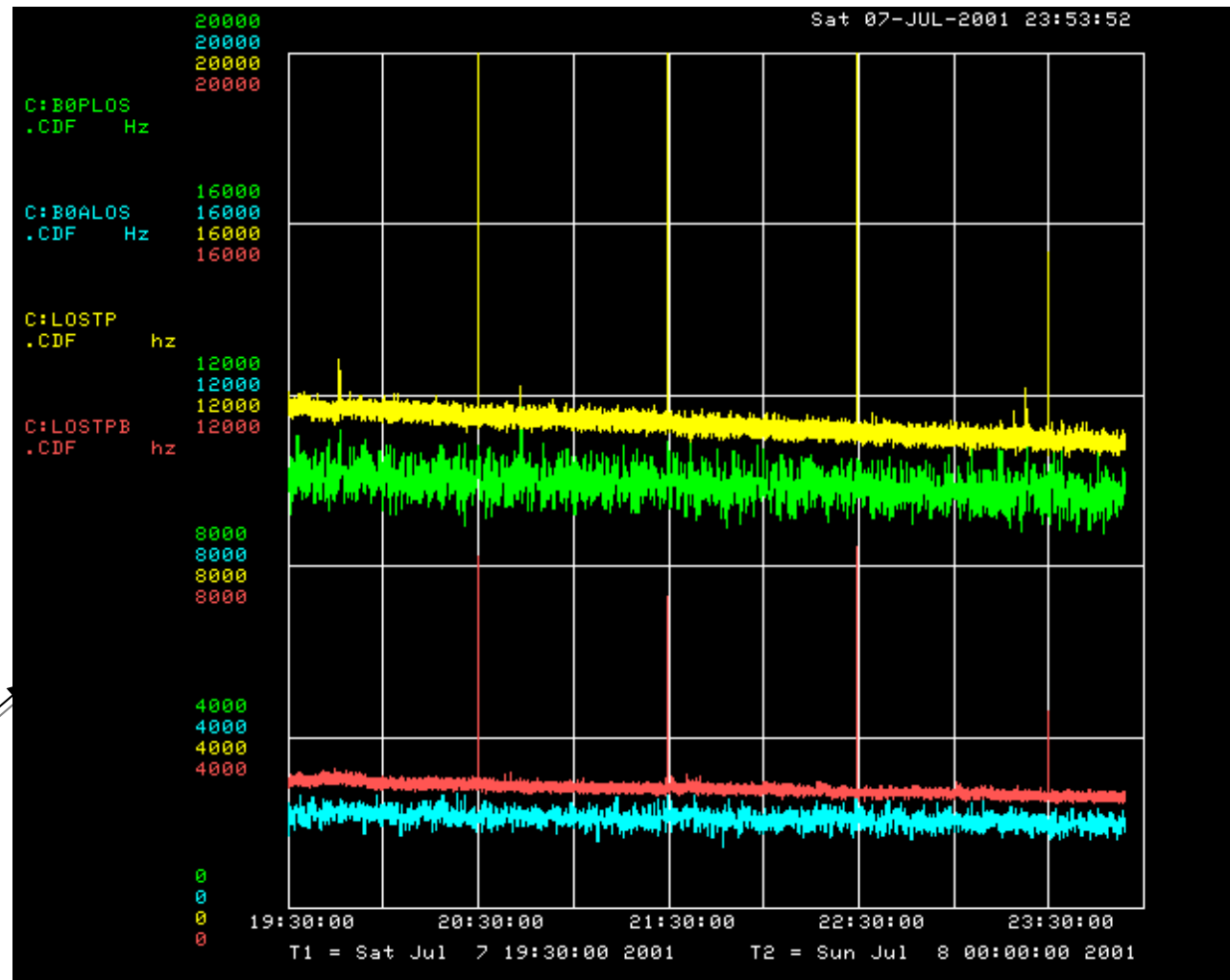
C:BOPLOS

C:BOALOS

C:LOSTP

C:LOSTPB

**Use ACNET
page E11
(E-Z Writer)
to create**



Shot Setup

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Shot Setup — What to watch in ACNET

To measure losses for the silicon detectors:

- E: SVBLA1 – west inner BLM instantaneous loss rate (rad/s)
- E: SVBLA2 – west outer BLM instantaneous loss rate (rad/s)
- E: SVBLB1 – east inner BLM instantaneous loss rate (rad/s)
- E: SVBLB2 – east outer BLM instantaneous loss rate (rad/s)

- E: SVRADO – west inner BLM integrated dose (rad)
- E: SVRAD1 – west outer BLM integrated dose (rad)
- E: SVRAD2 – east inner BLM integrated dose (rad)
- E: SVRAD3 – east outer BLM integrated dose (rad)

Example: Shot setup on July 7, 2001 (Evening shift)
(TeV store 567)

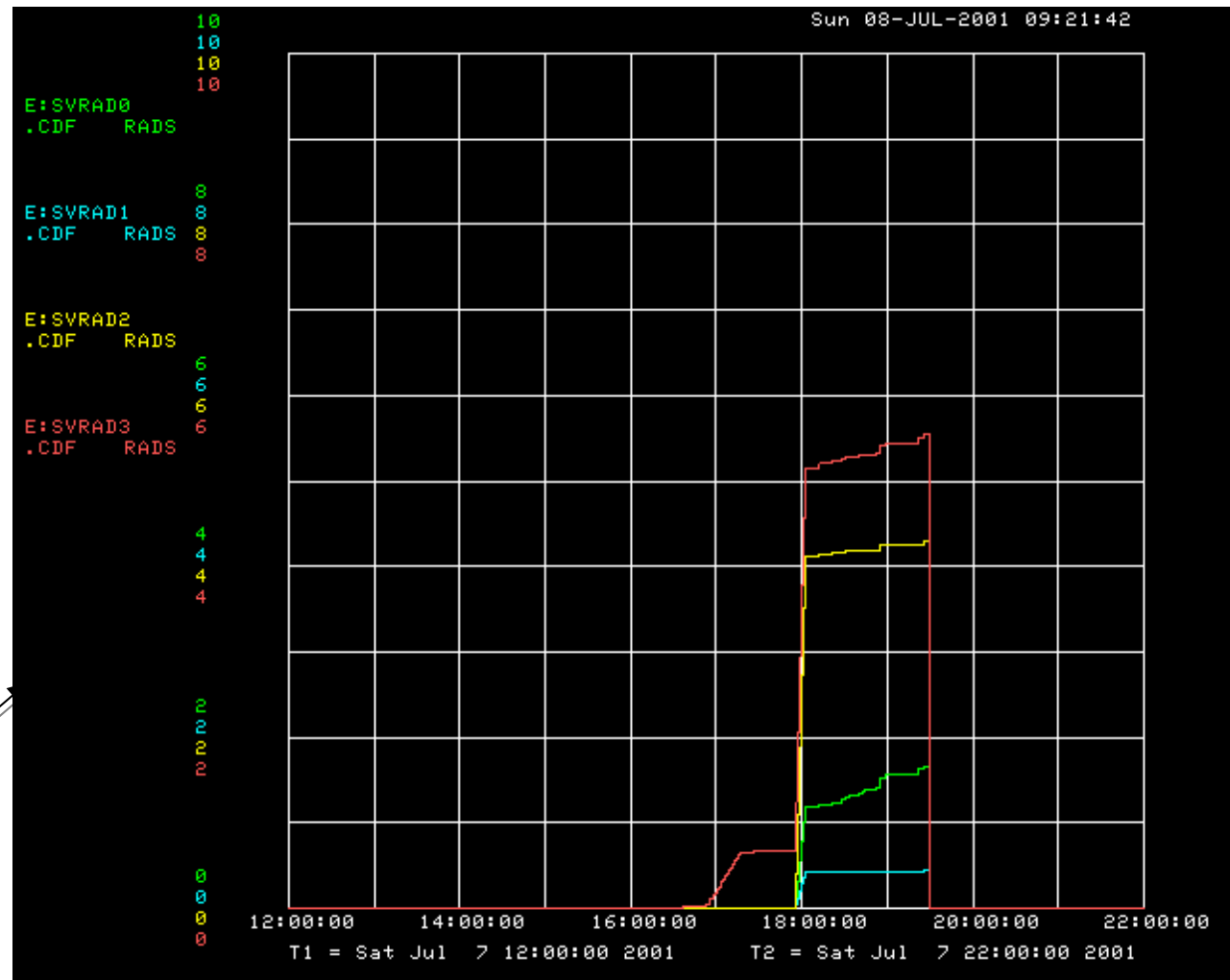
E:SVRAD0

E:SVRAD1

E:SVRAD2

E:SVRAD3

**Use ACNET
page E11
(E-Z Writer)
to create**



Shot Setup

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ACNET page E20 allows you to monitor the current values of the instantaneous and integrated dose rates.

E20 SVX Rad Scaler Readout ♦Pgm_Tools♦

*Global Reset

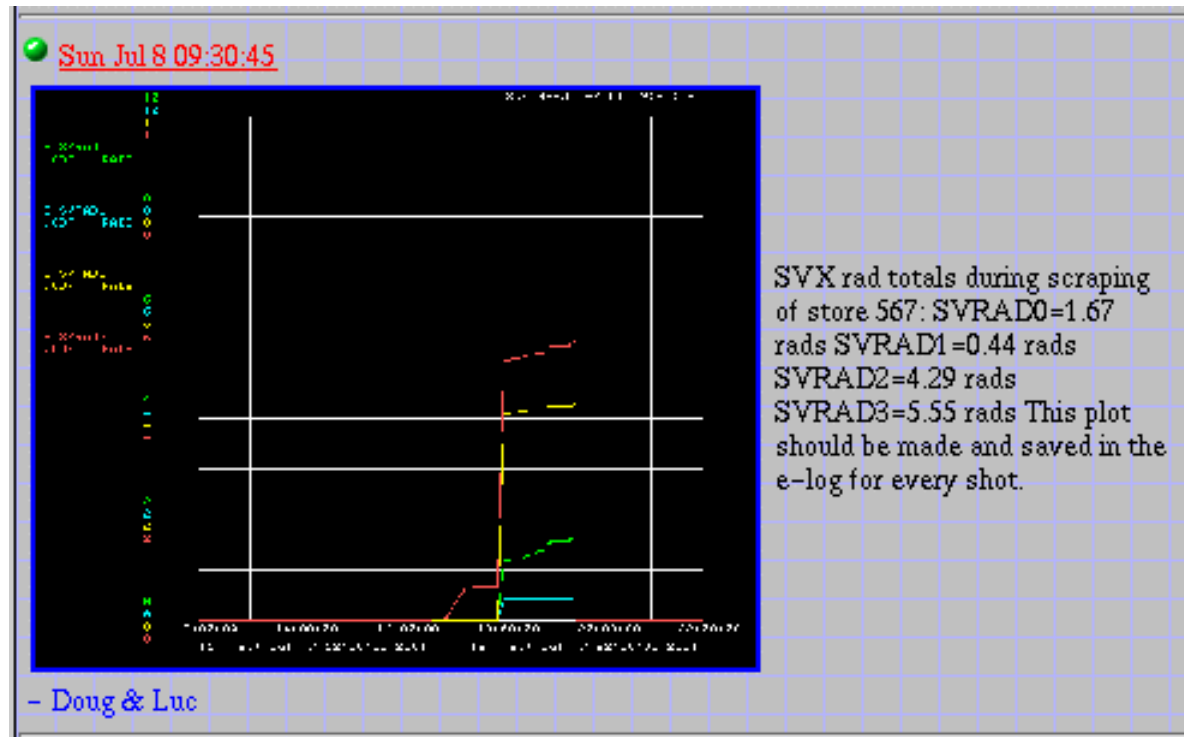
*Plot FIFO
*Select Display Options
*Display Logged Data
Fifos Recording

	Rate (R/s)	Sum (Rads)
W Inner BLM	0	.0378
W Outer BLM	0	0
E Inner BLM	0	4.192
E Outer BLM	0	3.189

Messages

Welcome to the SVX Loss Monitor Page

SVX rad totals should be recorded for every shot!



It is important to have these plots up to watch rates during ramping, squeezing, and scraping.

Example: TeV store 567 on July 8, 2001 (Owl shift)

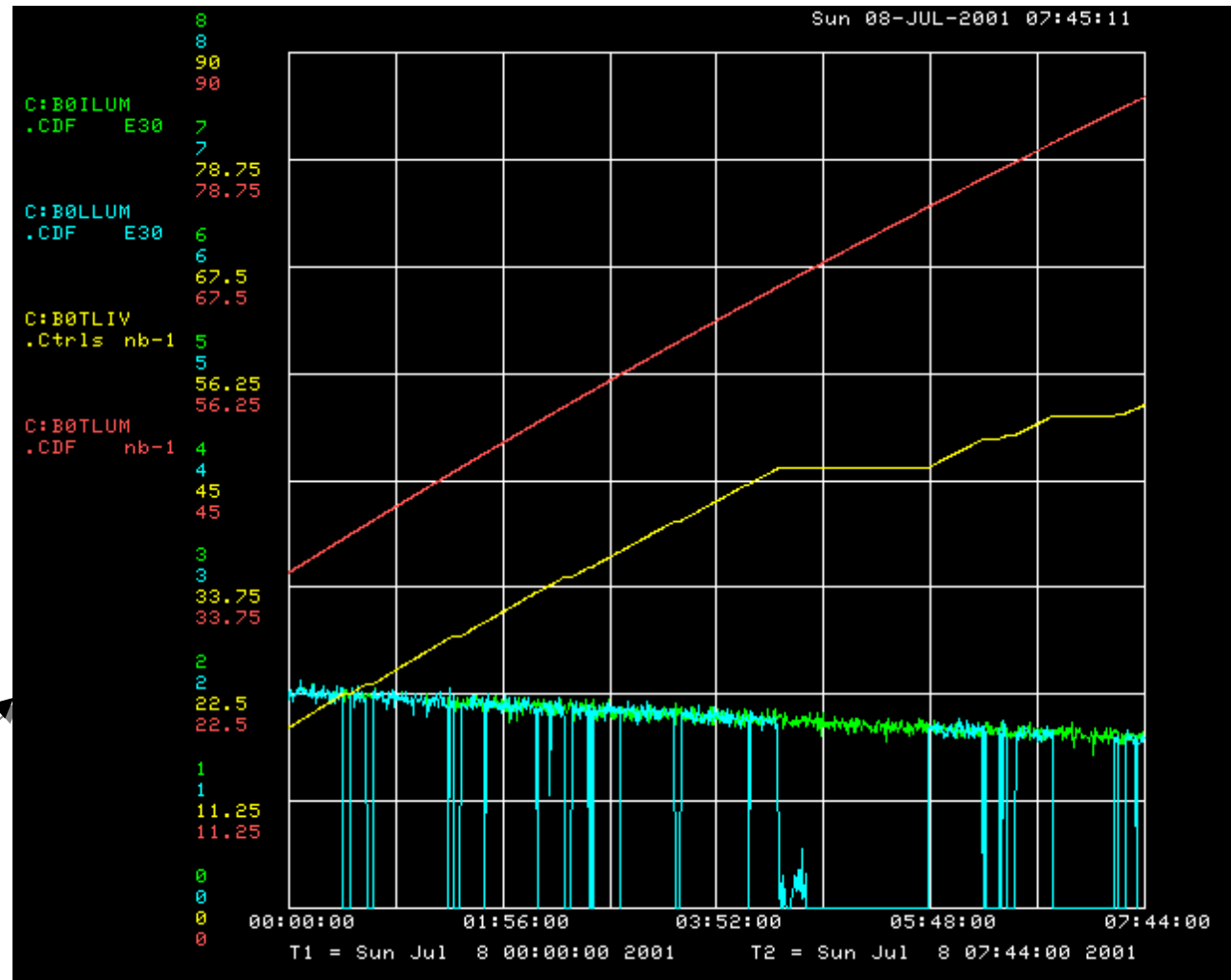
C:BOILUM

C:BOLLUM

C:BOTLIV

C:BOTLUM

**Use ACNET
page E11
(E-Z Writer)
to create**



Shot Setup

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Shot Setup — What to remember

- Use ACNET to follow the progress of Shot Setup
- For each shot, record:
 - ✓ The times of various milestones:
 - proton/antiproton injection complete
 - ramping to flattop
 - cogging, low beta squeeze
 - scraping complete
 - ✓ The loss rates before and after scraping (plot)
 - ✓ Initial instantaneous luminosity
 - ✓ Integrated delivered / live luminosity per shift (plot)
 - ✓ SVX rad totals (plot)

Monitoring and Controls (MCS)

Dave Ambrose

Ace Training

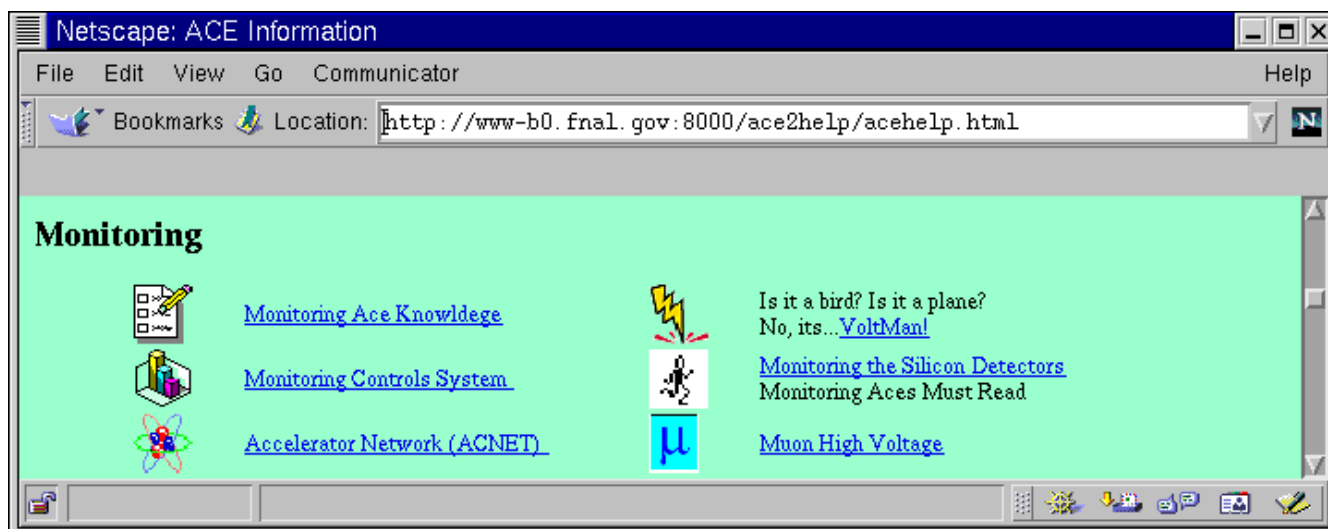
March 27, 2002

- information resources
- control room layout
- *iFIX* overview
- basic *iFIX* operation
- monitoring shift responsibilities



MCS: Information Resources

- Monitoring section of “Ace Page”



- “Monitoring Ace Knowledge”
 - needs updating badly, but...
 - contains links to CDF Run I/II Safety Procedures
 - lists current system problems
 - summarizes monitoring shift responsibilities, things to look out for (alarms, status boards, etc.)
 - describes VESDA and FIRUS systems
 - gives allowed values or ranges of important parameters in the system *iFIX* pages

MCS: Information Resources

(continued)

- “Monitoring and Control Systems” documentation page
 - links to MCS homepage and tutorials
 - online displays of *iFIX* pages
 - documentation for each detector sub-system, including:
 - * tutorials
 - * shift instructions
 - * recovery procedures

Netscape: CDF Hardware Monitoring Documentation and Recovery procedures

File Edit View Go Communicator Help

Back Forward Reload Home Search Netscape Print Security Shop Stop

Bookmarks Location: <http://www-b0.fnal.gov:8000/mcs/mondoc.html>

CDF iFix Slow	Controls (MCS)	ACNET - Beam	Utilities + Safety	DAQ, Misc
Tutorial - Homepage Instructions to Shift Recovery Procedure	Web-Server Pics Access Security	Tutorial Shot Setup - RadMon	Monitoring Ace Page	DAQ Ace info Operations page

Legend : **READY** , Preliminary , Not yet available

In case of problems with systems that do not yet have recovery procedure available, Please click here for [Expert call-in phone lists](#).

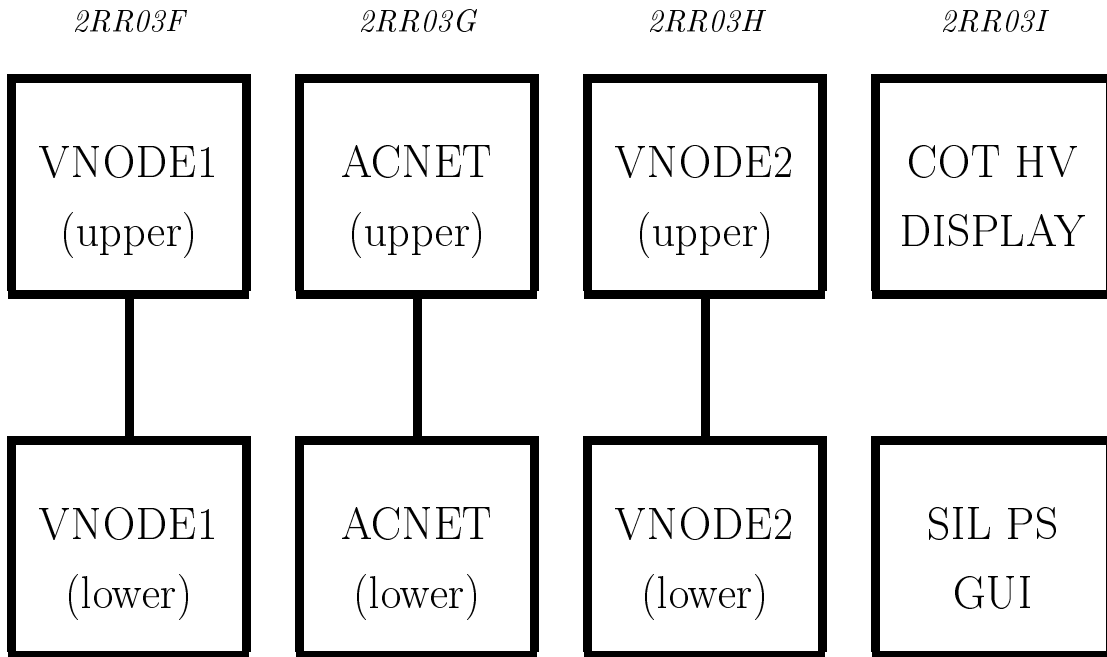
COT HV	MUONS - HV	CES-CCR-CPR	CEM,C/WH,GAM	Trigger Inhibit
Instructions to Shift	Instructions to Shift Trip Recovery	Intruction to Shift	Tutorial Instructions to Shift Recovery Procedure	Design Notes

SVX/SL, L00	CSX, CSP	TOF	PEM-PHA-PSH	xxx
Instructions to Shift Radiation Mon Cooling Mon Bias Voltage		Shift Instructions	Not Available	Not Available

xxx	TRU cot util	CLC	PTM plug temp	PSM power sup
Not Available	Not Available	Instructions to Shift	Instruction, Recover	See the Alarm Help Section on the VoltMan page for PSM trips.

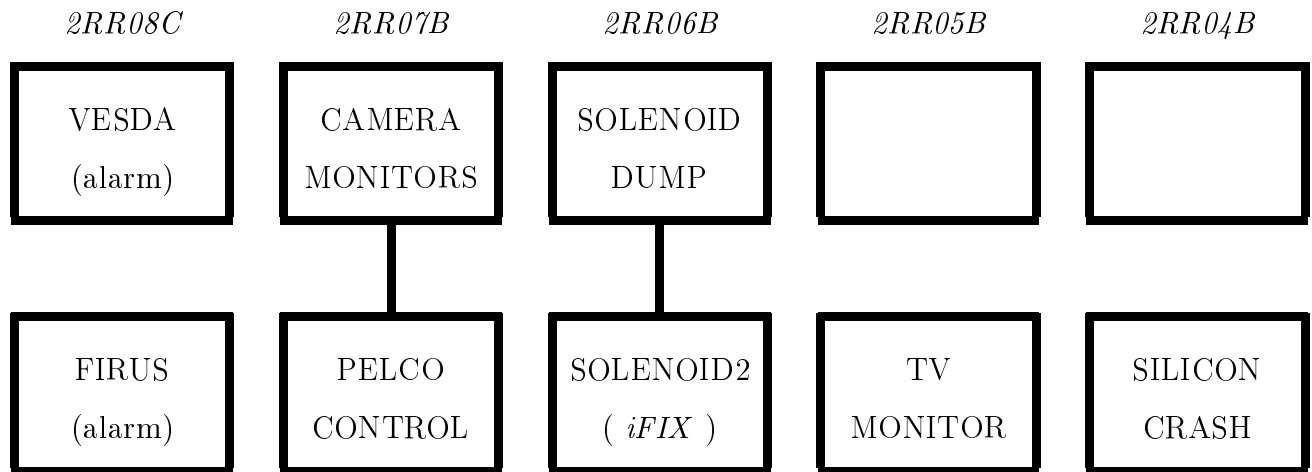
PC BACKUP	xxx	Template	xxx	xxx
Procedure What items Other Info	Not Available	Tutorial Instructions to Shift Recovery Procedure	Not Available	

MCS: Control Room (West)



- VNODE1: (*iFIX* node)
 - for global summary pages, voice alarms
- ACNET: (ACcelerator NET)
 - accelerator monitoring (beam current, luminosity, losses)
- VNODE2: (*iFIX* node)
 - for general monitoring use
- COT HV DISPLAY: (read only)
 - displays HV/current for 25 wires of superlayer
 - “Trip Log” records ramping and SL/wire info of trips
- SIL PS GUI: (expert only)
 - Silicon power supply monitoring/control

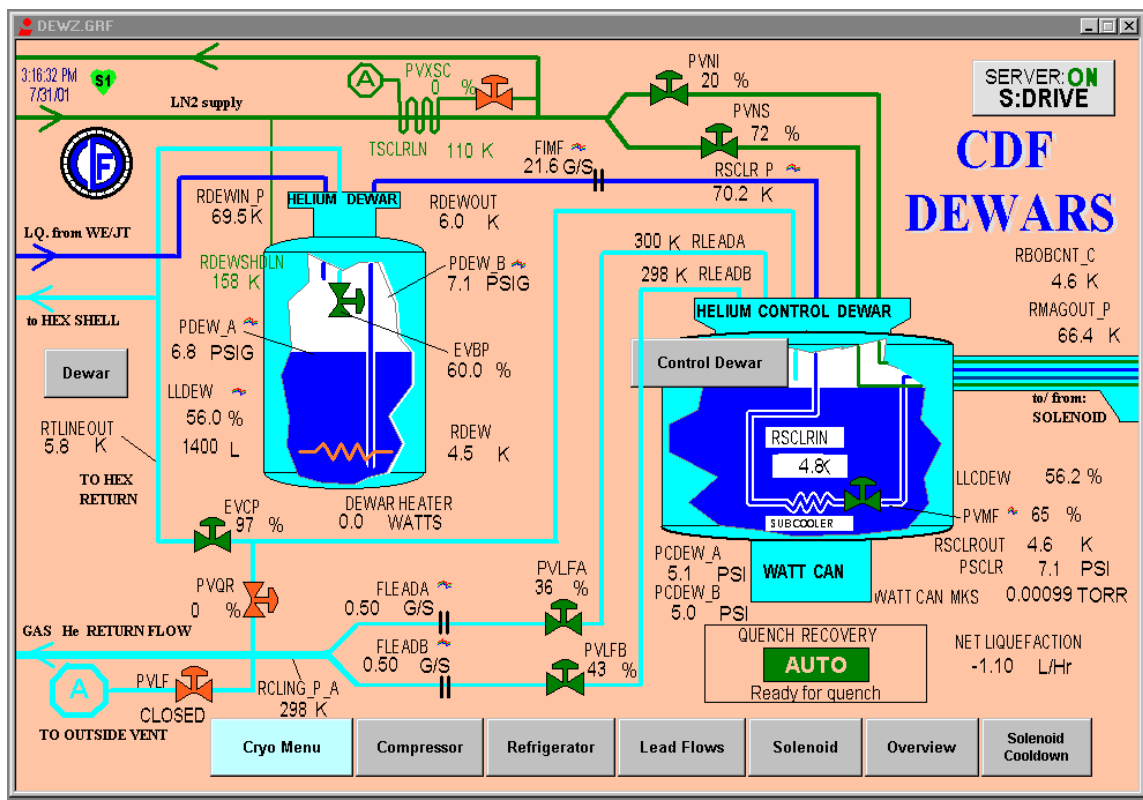
MCS: Control Room (South)



- VESDA: (collision hall smoke detector)
 - may show 0.1-0.2 during accesses
 - 0.4/0.7 generates FIRUS TROUBLE/EMERGENCY
- FIRUS: (fire alarm system display)
 - TROUBLE warns of pre-alarm condition
 - EMERGENCY describes real alarm, follow ERP
- SOLENOID CRASH:
 - indicators, crash buttons for slow/fast dump
- SOLENOID2: (*iFIX* node)
 - dedicated node for magnet control/monitoring
- SILICON CRASH:
 - cooling (expert only) and rack power crash buttons

MCS: *iFIX* Overview

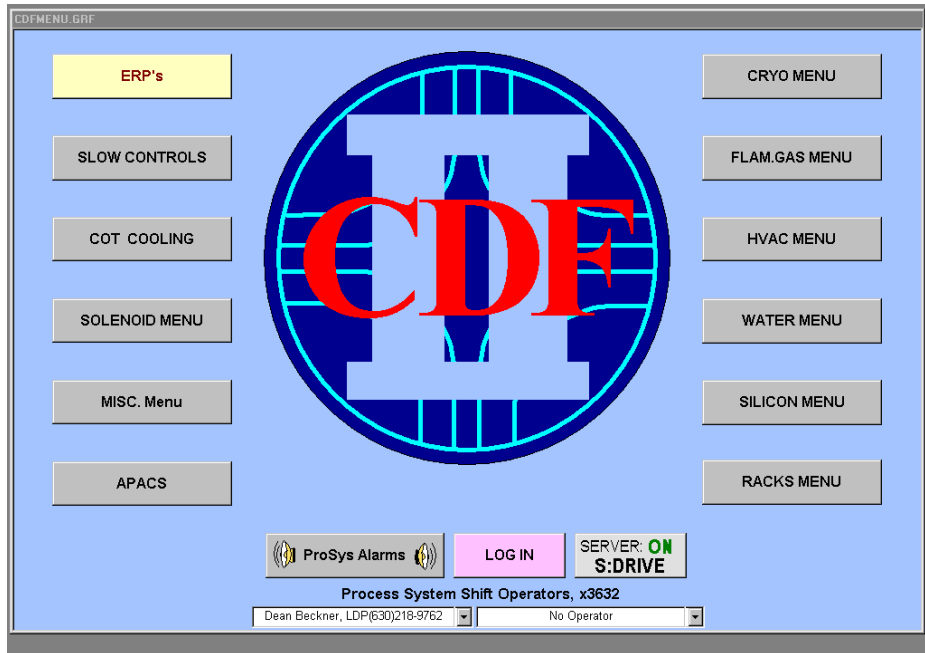
- *iFIX* (Fully Integrated Control System, by “Intellution”):
 - allows PC to control/monitor equipment with GUI's
 - CDF system uses 15 nodes (PC's), including:
 - * VNODE1 - summary pages
 - * VNODE2 - general use
 - * SOLENOID2 - magnet monitoring
- *iFIX* allows people on shift to:
 - monitor detector and support systems
 - perform basic (non-expert) control during data taking
 - alert experts when exceptions occur
- example *iFIX* page (from *CRYO MENU*):



MCS: *iFIX* Overview

(continued)

- *iFIX* pages have *web*-like structure of sub-menus and pages all pointing to *MAIN* menu:



link icons

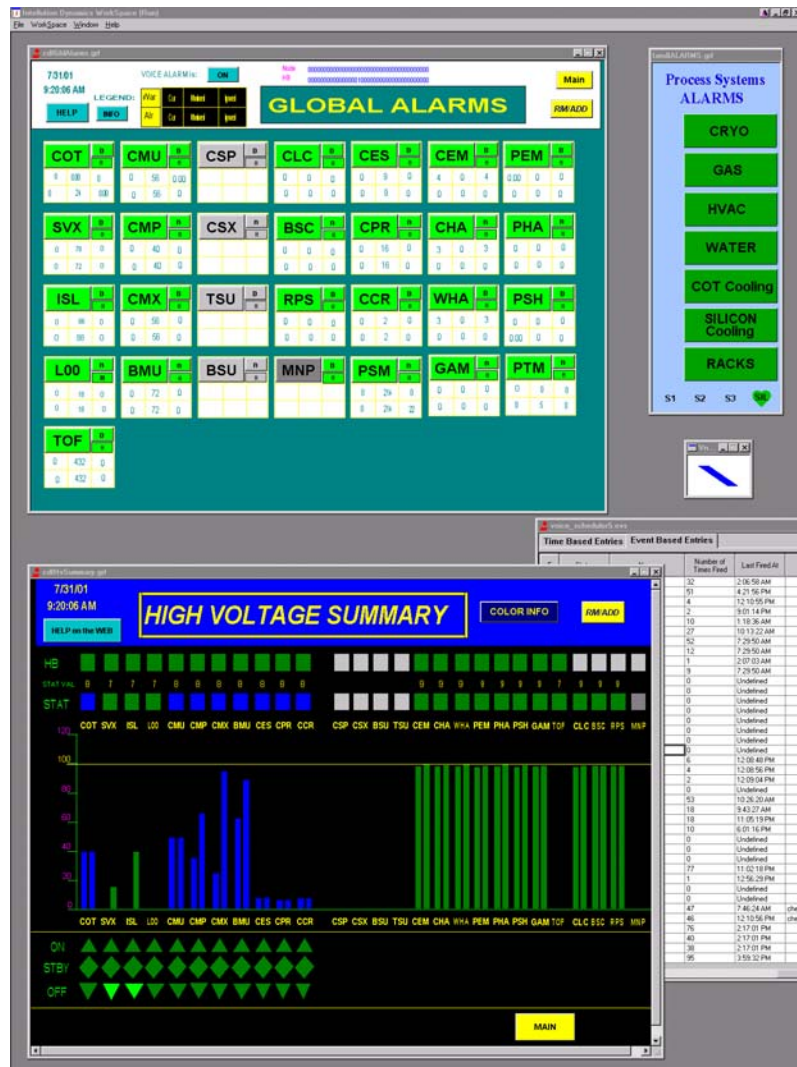


- shows cryo tech on shift ($\times 3632$)
- displays *iFIX* status:
 - * *SERVER* should be *ON*
 - * *DRIVE* should be *S* (main cryo PC), as opposed to *C* (for local PC drive)
- can restart *iFIX* from “Start” menu:

Start / Programs / *iFIX* / Int. Dyn. WorkSpace
- log on with two possible accounts:
 - * *PUBLIC* (no password) for general monitoring
 - * *ACE* (see J.C.Yun) for resetting HV, etc.

MCS: Basic *iFIX* Operation

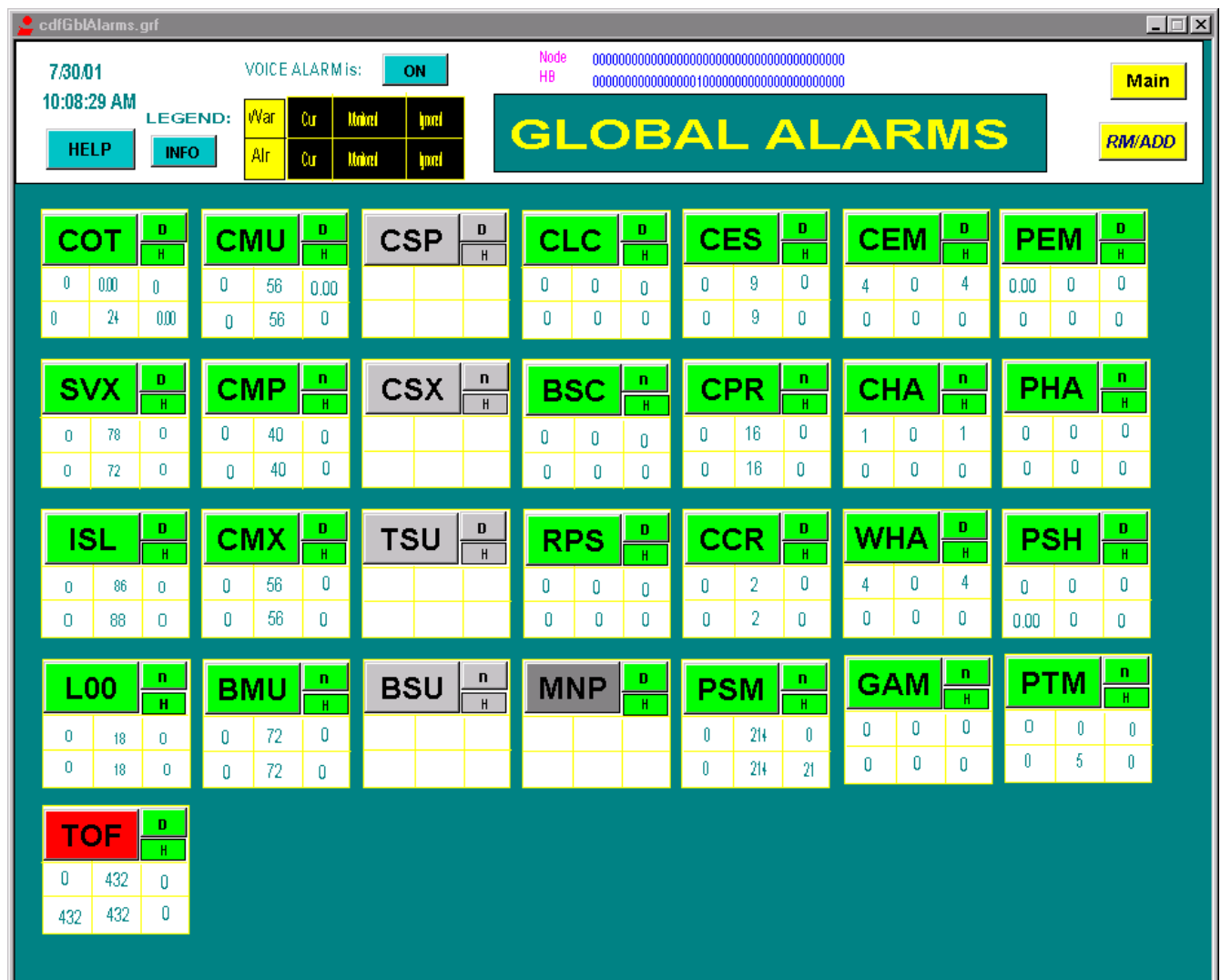
- essential sub-detector and support system values are grouped into three summary pages, which show acceptable ranges and trigger out-of-bounds alarms:
 - GLOBAL ALARMS*
 - HV SUMMARY*
 - Process System ALARMS*
- VNODE1 displays *iFIX* alarm summary pages, along with:
 - PINWHEEL* - blue ascii pinwheel rotates when *iFIX* is “alive” (and ready to accept mouse clicks)
 - SCHEDULER* - runs audible voice alarm program



MCS: Basic *iFIX* Operation

(continued)

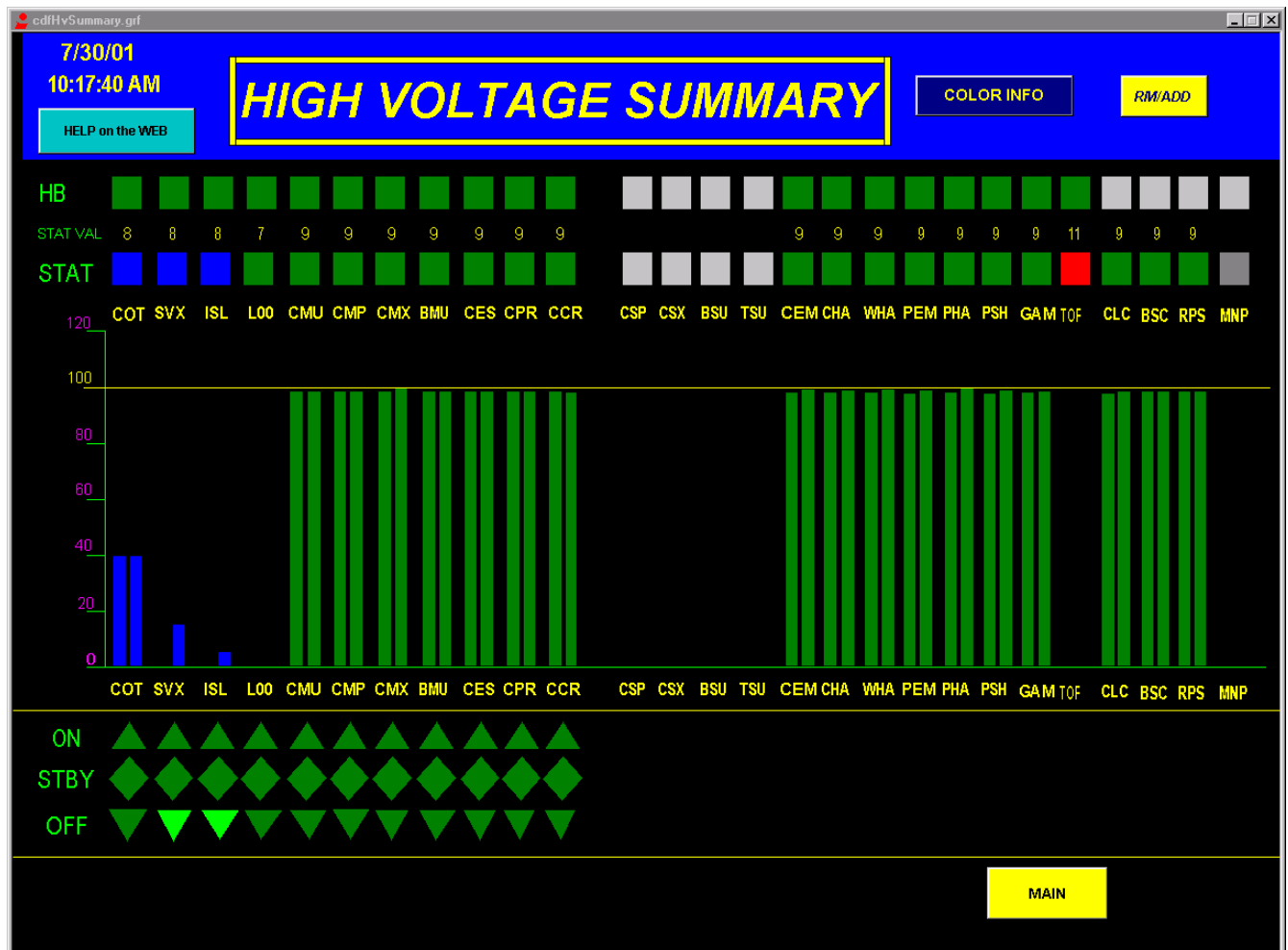
- *GLOBAL ALARMS* summarizes the status of detector and power supply systems, showing for each system:
 - matrix of monitored values, warnings, alarms, and ignored quantities
 - link to error history display (large button, e.g. *COT*); green if OK, red for alarm
 - link to detector controls (*D*)
 - status of *iFIX* node, or heartbeat (*H*)



MCS: Basic *iFIX* Operation

(continued)

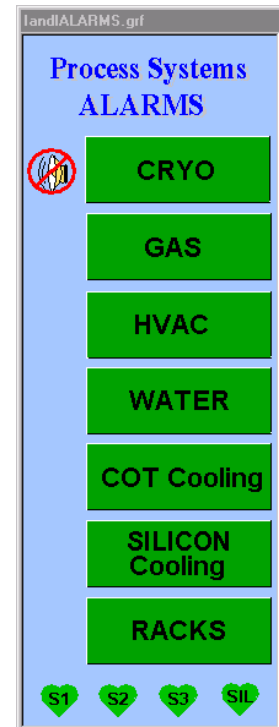
- *HV SUMMARY* displays the high voltage status of each detector, and allows for control of specific systems:
 - *HB* row shows heartbeat status (green is OK, purple is bad)
 - *STAT* gives status condition (green is OK, blue is STANDBY, red is TRIP)
 - double-bar histogram shows percentage HV for minimum and maximum out-of-range signals
 - “arrow” controls turn HV on, off, or to standby



MCS: Basic *iFIX* Operation

(continued)

- *Process System ALARMS* summarizes the status of detector support systems:
 - global button for each subsystem (green is OK, red is ALARM)
 - indicator left of global button signifies that alarm is silenced
 - heartbeat indicators for four cryo area *iFIX* nodes (blinking)
- if there is an alarm:
 - call cryo tech ($\times 3632$) to confirm
 - click global button to open summary page and determine cause, for example:

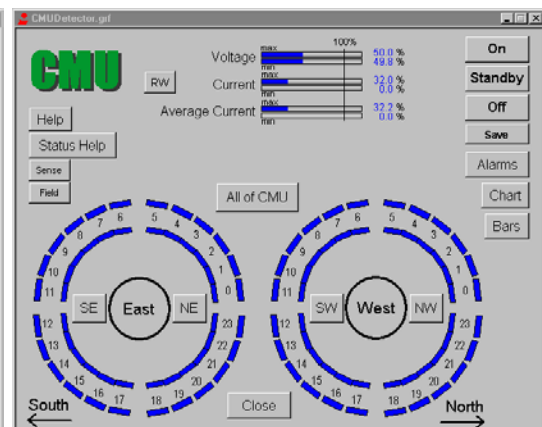


CRYO ALARMS						
DEVICE		DESCRIPTION	LO LIMIT	CURRENT VALUE	HI LIMIT	Audible Alarm
<u>COMPRESSOR</u>						
PCPDIS		Discharge of Purifier Skid	200.0	279.9 psig	320.0	
PCPSUC		Compressor Suction Pressure	0.25	1.00 psig	10.00	
CMP-CON		Compressor On Status		OK		
<u>DEWARS</u>						
FLEADA		Flow Rate Lead A Run Mode	0.40	0.50 g/s		
FLEADB		Flow Rate Lead B Run Mode	0.40	0.50 g/s		
LLCDEW		Control Dewar Superconducting LL	32.0	56.16 %		
LLDEW		LHe Storage Dewar Level	23.0	56.04 %		
VWCAN-MKS		Watt Can MKS		0.001 torr	0.007	
FMF		Helium Flow Into Magnet	12.0	21.96 g/s		
<u>MAGNET</u>						
RBOCNT-C		Coil Bobbin Center Temp		4.6 F	13.00	
<u>VACUUMS</u>						
VCDEW		Control Dewar Vacuum Pirani		0.00 torr	0.019	
<u>ADSORBER</u>						
LL-ADSB		Adsorber N2 Level	50.0	80.11 %		
<u>REFRIGERATOR</u>						
WE-XS-ON		Wet Engine Status Engine ON		OK		
NDE-XS-ON		North Dry Engine Status Engine ON		OK		
EDE-XS-ON		East Dry Engine Status Engine OFF		OK		

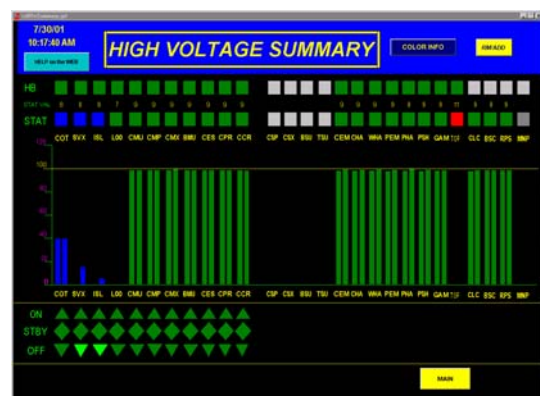
MCS: Basic *iFIX* Operation

(continued)

- as an example, if the CMU trips:
 - go to *GLOBAL ALARMS* and click *CMU* to bring up alarm history (record in e-log)
 - from the *D* button, open CMU HV control GUI to reset specific channels



- HV trips can also be reset from *HV SUMMARY* by clicking the *ON* arrow
- HV SUMMARY* should be used to place detectors on standby for “flying wires” (for COT, SIL, and CMP)



MCS: Shift Responsibilities

- write list of all silenced alarms or other exceptions in e-log at the beginning of shift
- continually monitor VESDA, FIRUS, and LED status board in the control room for alarms or trouble (refer to “Monitoring Ace Knowledge”)
- beginning/end of store, “flying wires”:
 - use “HV Summary” to turn ON/OFF/STBY detectors
- detector HV trips:
 - use “Global Alarms” to determine source
 - consult MCS Web Page for specific instructions
 - use “HV Summary” to reset or page expert
- lost heartbeat (purple):
 - notify system experts
- Process System Alarms:
 - click on system button to determine cause
 - check with cryo techs for instructions
- *iFIX* logged out or “unavailable”:
 - click on Start/Programs/*iFIX*/Login
 - logout of *ACE* account, log back in
- *iFIX* crashes: (page Ops Manager and experts)
 - J.C. Yun, 722-7589
 - John Yoh, 840-4774

DAQ

The CDF Data Acquisition consists of the infrastructure, electronics and software used to collect data, calibrate detectors, monitor and configure the electronics.

The Front End (FE) electronics consists of a combination of custom built modules, designed and built by many different institutes and universities from across the world, and commercial off the shelf hardware.

Security Issues

As part of your job you are required to use computers that are designated as part of the CDF Critical System.

It is your responsibility to help minimize the possibility of loading software that has an adverse effect of the performance of these systems (e.g. software viruses, hacker kits). The most frequent incident we've had in the critical system involves PC viruses loaded on windows based PCs.

A common way that a virus is loaded on windows based PCs is through email attachments. From a critical system computer you should not open email that is not needed for the critical system operations or is unexpected. Be aware that many new viruses can spread via open Windows file shares or downloads from websites (so beware mail saying "click here").

The windows based PCs are to be used for Slow controls functions only. Email, web, and any other general purpose access should be done on some other system. There are linux based PCs that can be used for this purpose.

Do not install any software on the CDF Critical System PCs. If you feel that there is a software package which would be useful please contact one of the system administrators to arrange for the package to be installed.

Your other major responsibility is to avoid letting non-authorized persons gain access to the critical systems through your means. Keep your password secure, difficult to guess and secret. Have your account disabled if you won't need it for months. Watch for indications that your account has been used by someone else. Do not leave your session unattended for extended periods of time.

In the past, systems on site have been compromised and these compromised systems have initiated attacks on offsite networks...

Fermilab is one of the more open labs. If it is perceived, by the people who fund us, that we are unable to manage our computers in such an open fashion we will be pressured to tighten security up...

The online network is split into a “lower half” (trigger room) and “upper half” (control room).

The lower half is used for development and monitoring tasks that are not critical for taking data while the upper half is used to support data taking.

General use PCs.

b0dap06.fnal.gov	b0dap01.fnal.gov
b0dap12.fnal.gov	b0dap16.fnal.gov
b0dap18.fnal.gov	b0dap21.fnal.gov
b0dap19.fnal.gov	b0dap26.fnal.gov
b0dap20.fnal.gov	

From the CDF offline network (trailers) onsite you can log in directly to the trigger room PCs.

From offsite you have to go through one of the designated gateway node, b0dap30 or b0dau30 or log into a trailer PC then into the lower half of the online network.

Kerberos and You or... How to Get Around

In general one should NOT type in a password over the network. Once logged into a local machine you can forward your credentials to the next machine using *ssh* or *rlogin -F*

```
> ssh hostname  
> rlogin -F hostname
```

ssh configures your x window environment so you do not have to set the display variable and this is the simplest way of logging into another node.

⇒ User is on a group account cdfdaq and wants to go to another PC with the same group account.

```
b0dap50_cdfdaq> kticket  
b0dap50_cdfdaq> ssh nodename
```

⇒ User is logged onto a group account and wants to get a ticket for their own account.

```
b0dap50_cdfdaq> kinit username  
b0dap50_cdfdaq> ssh nodename
```

This ticket is valid only from the window you issued the command. You will be logged into the remote node as the user you specified in the kinit command.

⇒ Can display a X window originating from the remote machine.

On the remote PC (fcdfsgi2)

```
fcdfsgi2_username> xterm (to check if X works)
```

When work is done.

```
fcdfsgi2_username> exit  
b0dap50_username> kdestroy
```

One should enter "kdestroy" in the same window where you issued done "kinit", to destroy the ticket.

⇒ What controls access for a user to an account?

Users can log into an account provided that they are in the .k5login file. This file is owned by root.

→ The first three people in the .k5login file are responsible for the group account.

To get around, use kerberos rlogin or kerberos telnet or kerberos ssh with kerberos ticket.

To check current ticket

```
b0dap50_cdfdaq> klist
```

To check a default rlogin (telnet, ssh)

```
b0dap50_cdfdaq> which rlogin (telnet, ssh)
/usr/krb5/bin/telnet
```

To list your current tickets

```
> klist
```

If you have problems (in getting from one machine to another)... let us know.

Overview of the DAQ Components

Trigger Supervisor and Crosspoints

Receives trigger decisions from the L1 and L2 global trigger systems and distributes trigger signals through the trigger cross points to the DAQ components.

Front End and Trigger VME Crates

Reads out, formats and transfers the data.

Event Builder

Assembles data fragments from the many FE crates into one block.

Level 3 Trigger

Formats the data into the final data format (root). Have access to the entire event record and can run offline code to make trigger decisions.

Consumer Server/Logger

Receives data from L3 and writes data to disk in several different data streams based on L3 trigger results. Also distributes events to the consumers.

Run Control

Coordinates data taking and detector calibrations.

DAQ Monitoring

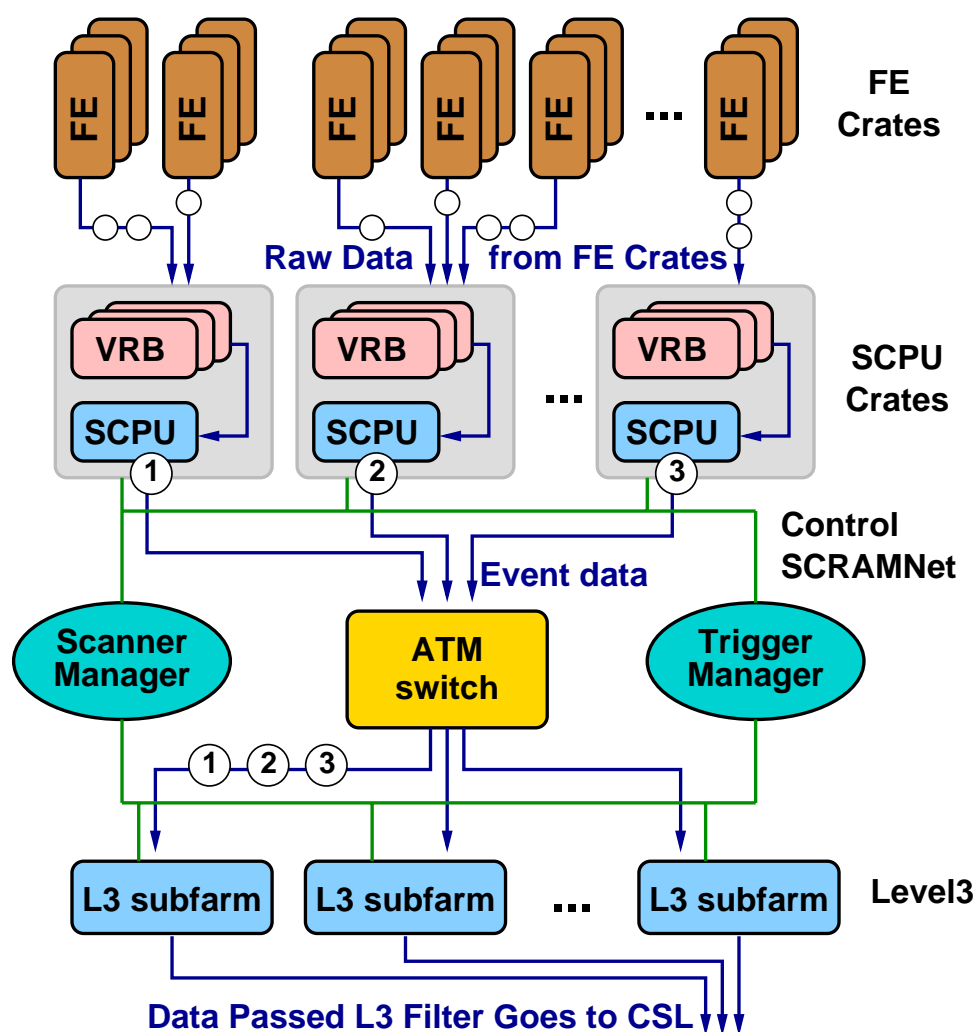
Monitors DAQ performance.

Data Monitoring (Consumers)

Monitors the data quality.

The data is self describing. The VME Readout Controller (VRC) forms a mini-bank by attaching a header, which identifies the data type and the block number, to the data block.

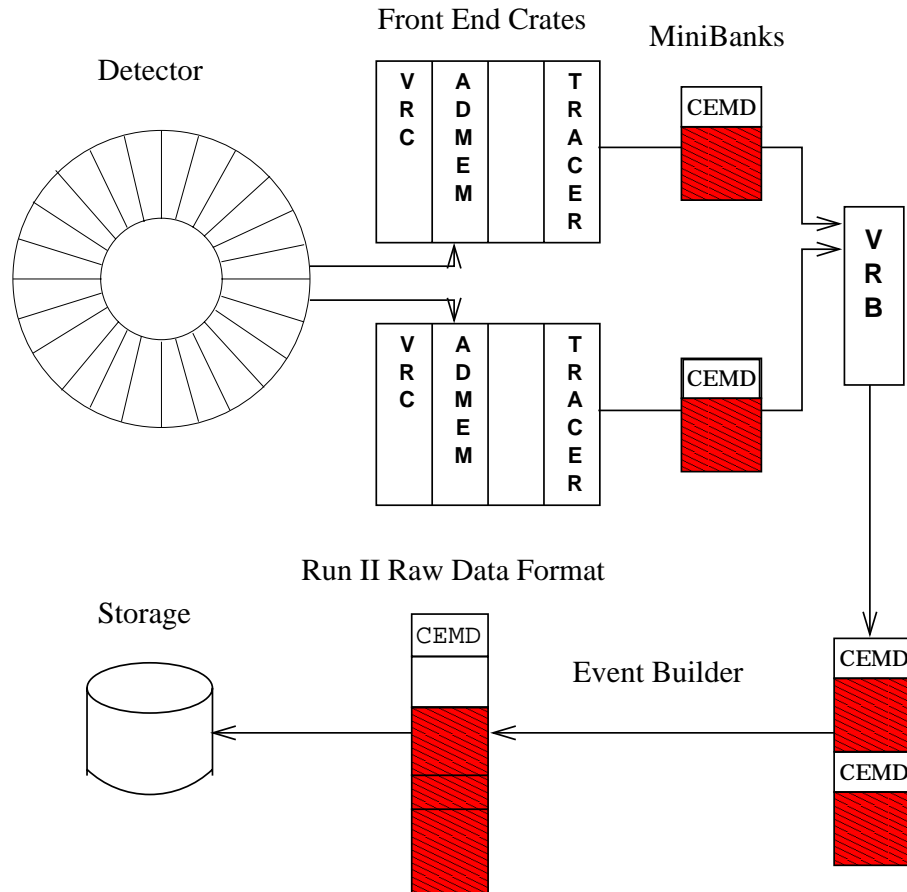
This mini-bank is then transferred to one of 15 VME Readout Buffer (VRB) crates. Several VRBs in a crate and each VRB can receive data from up to ten FE crates.



The event fragments are then sent through the ATM switch to a converter node which distributes the data to the processor nodes of L3.

The reformatter code assembles the minibanks into the final event format making it available to the L3 analysis code.

→ Events having corrupted fragments are rejected by the reformatter.



At L3 the reconstruction can add reconstructed objects to the event record.

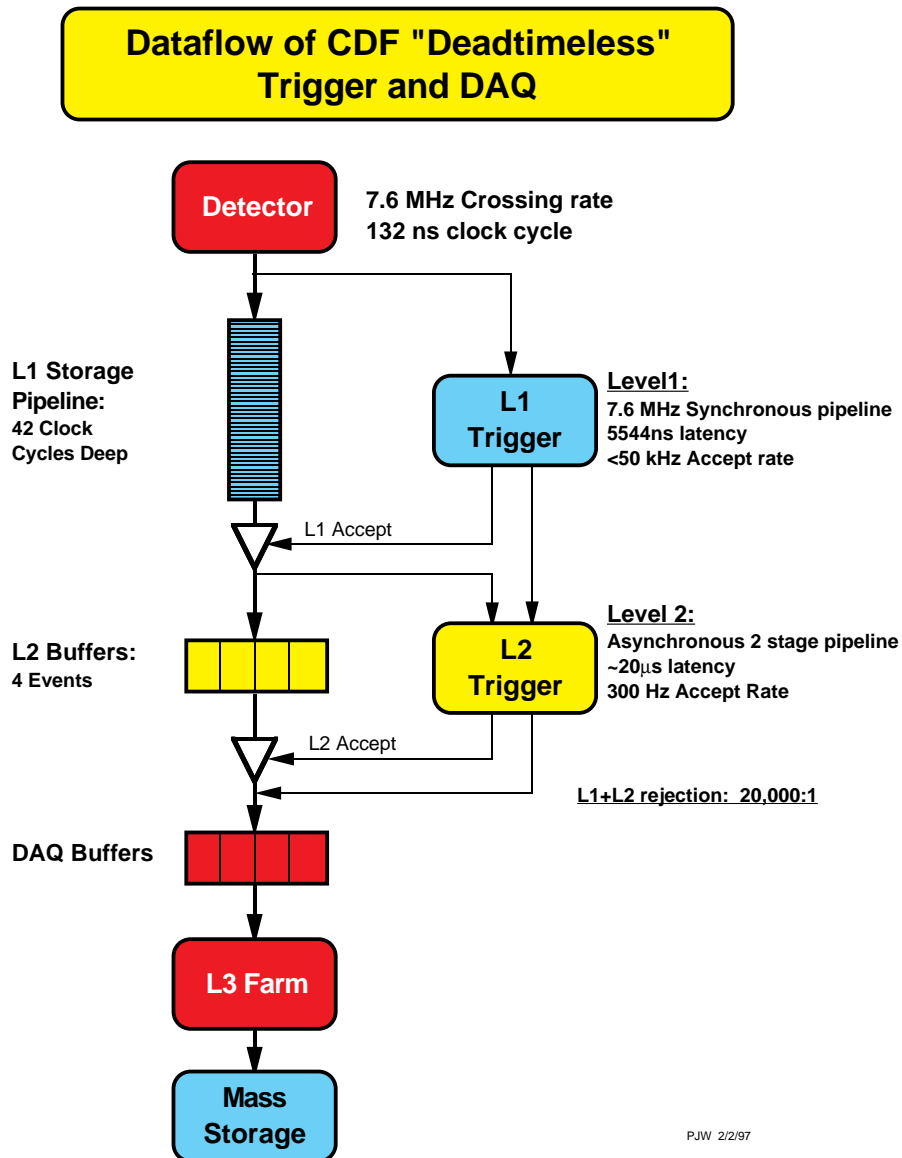
Events passing the L3 trigger are sent to the Consumer Server Logger and a fraction of the events are distributed to monitoring consumers.

Events are transferred to Feynmann Computing Center (FCC) for storage on tape.

Users access the data through the Data Handling System.

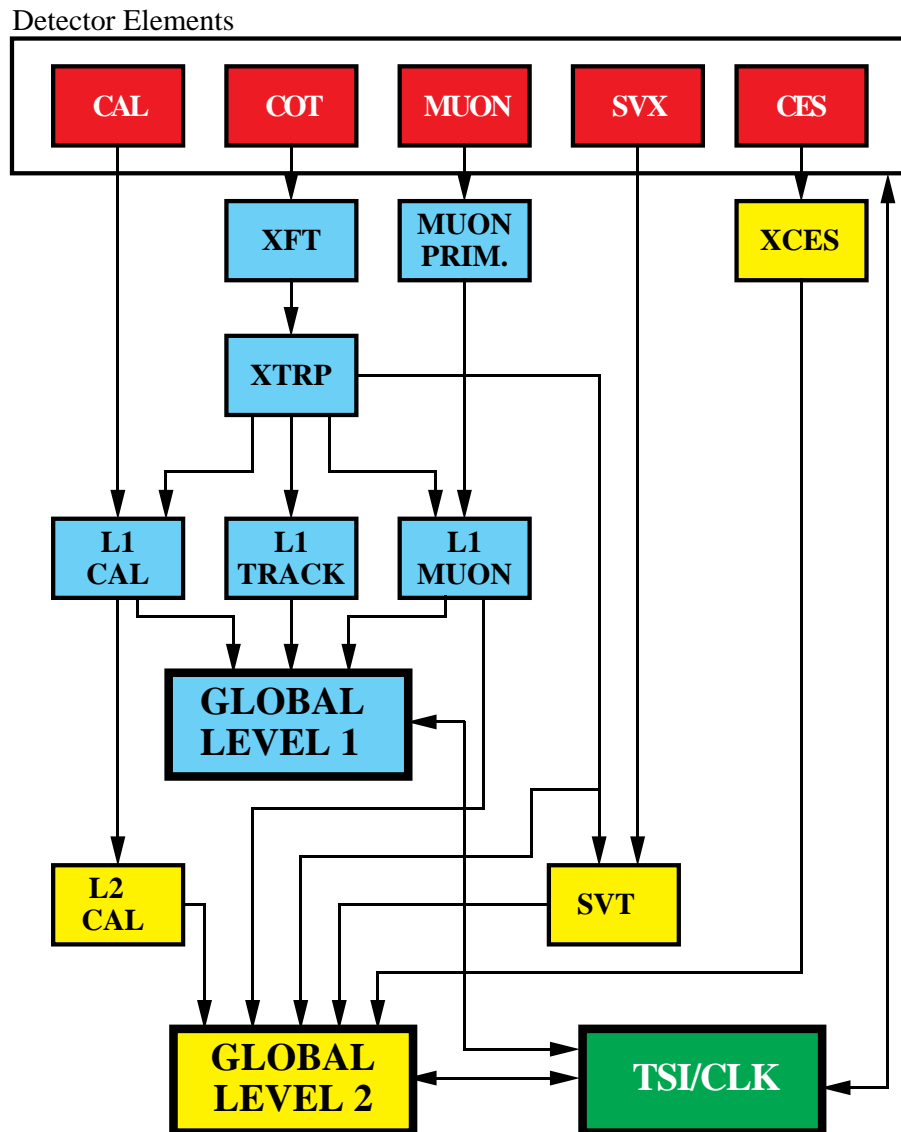
Trigger System

The trigger system is used to select an event rate of 75 Hz from the 7.6 MHz (132 ns crossing) beam crossing rate.



Done in three stages: Beam crossing rate of 7.6 MHz (for 132 ns crossing) is reduced to ≤ 50 KHz, by the L1 trigger, reduced to 300 Hz by L2 and finally to about 75 Hz by L3.

RUN II TRIGGER SYSTEM



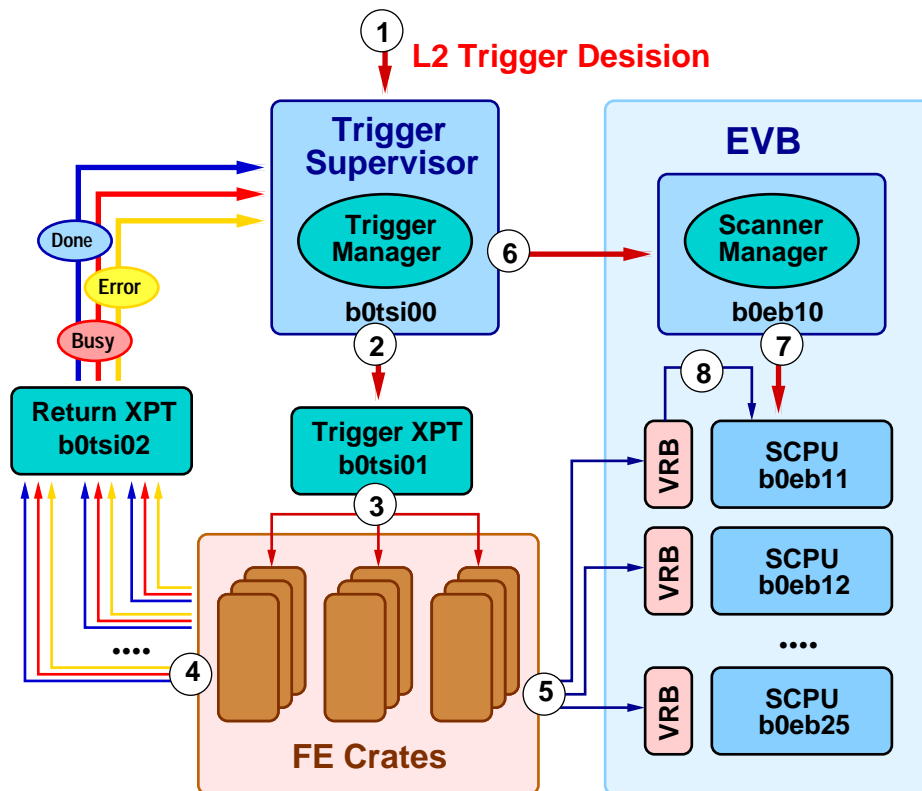
PJW 9/23/96

Each stage has access to more complete data and has more time to process the event. At L3 you have the final complete event and can run sophisticated offline algorithms.

So far we have been running with a L1 trigger at rates up to 400 Hz, L2 has been passing all events and we are rejecting jet events at L3 below threshold.

The L2 Trigger sends the trigger decision to the Trigger Supervisor (TS).

The L2 trigger decision is sent to the FE crates through the trigger cross point.



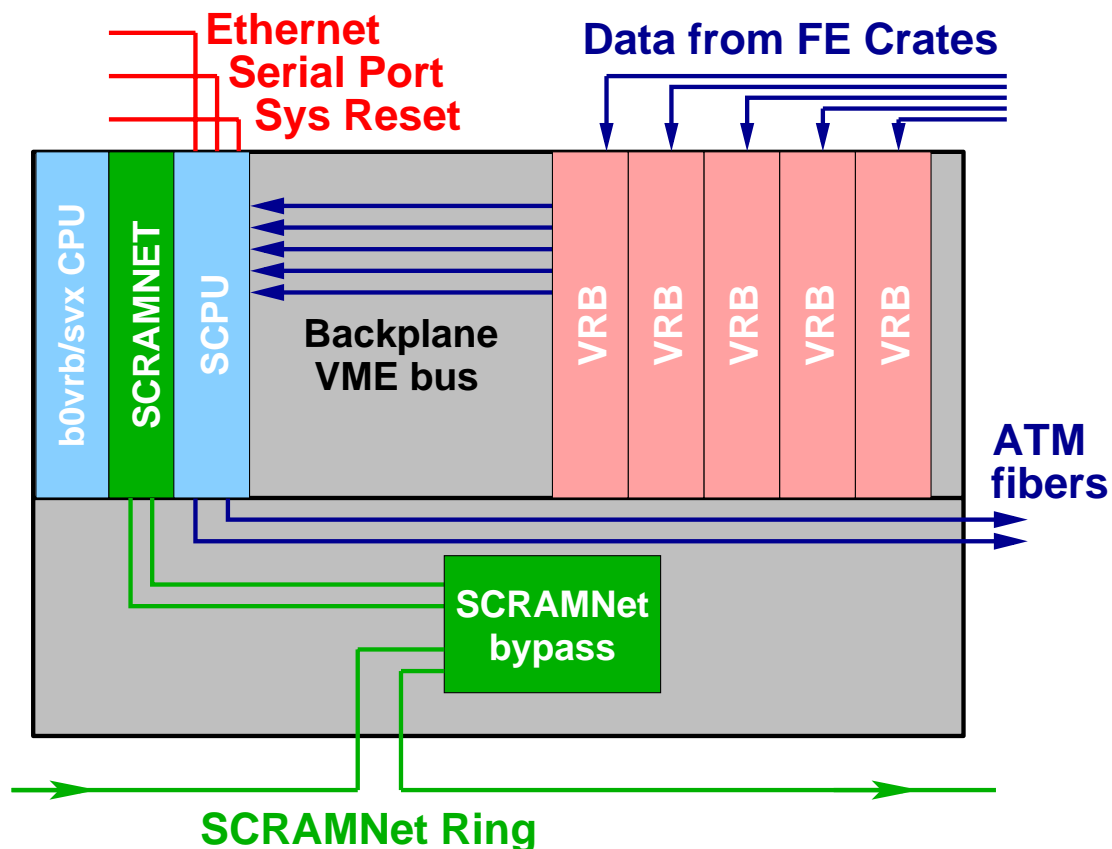
When the trigger decision is received in the FE crate, the VME Readout Controller (VRC) sends back a DONE signal to the TS via the return cross point indicating that it is ready to receive the next trigger decision.

Data is read out from the FE cards (TDCs, ADMEMs...) formatted and sent via the TRACER to the VME Readout Buffers VRBs.

If there is not enough space to write out the event to the VRB a **BUSY signal** is sent back to the TS so that the TS does not issue another trigger which leads to busy deadtime.

→ If the busy is not deasserted in time we can get a Busy Timeout causing the run to halt.

Each VRB can receive data from up to 10 different front end crates.



Data is readout of the VRBs by the Scanner CPU (SCPU) and sent through the ATM switch to the L3 farm.

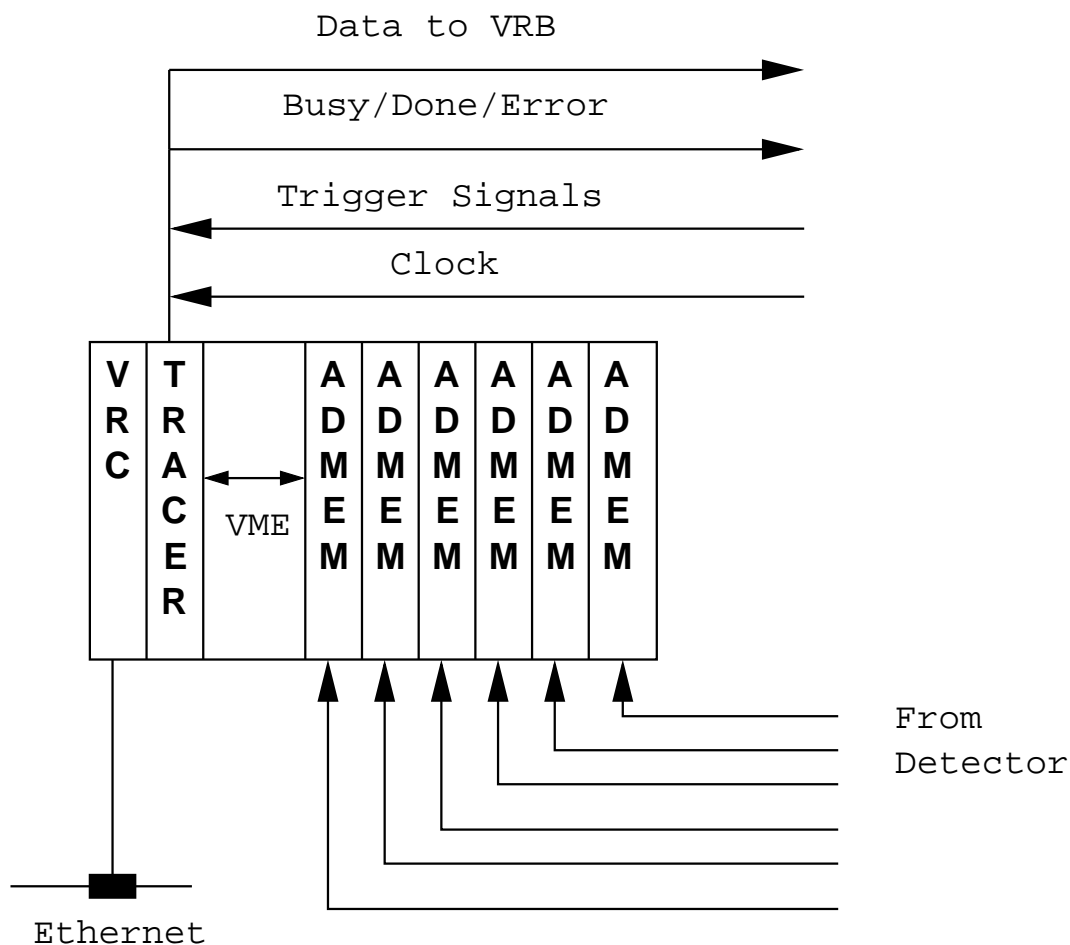
The SCPU communicates with the TS via SCRAMNET.

Typical Front End/Trigger Crate

Front End (FE) and Trigger electronics are housed in VME crates, an industry standard backplane (aka a crate) into which compliant cards can be plugged into.

<http://www-esd.fnal.gov/esd/catalog/vmedir.htm>

A typical crate will have a **VME Readout Controller (VRC)**. Usually a Motorola MVME 2301 with a Power PC 603 CPU running VxWorks, a **TRACER** used to fan out trigger and clock signals to the VME backplane and to transport data out of the crate, and the FE electronics.



VxWorks is a real-time operating system having a fast interrupt response and network connection.

The front end crates have node names such as b0pcal00 etc. You can log in to the crate to check the status but this is not usually necessary during normal running. It is useful for tracking down problems.

There are about 120 FE/Trigger crates, about half of which are mounted on the detector and are not accessible during collisions.

Crates will also have a **TRACER**. This card receives the clock and trigger signals and distributes them on the VME back plane for the other modules to pick up.

Returns control signals back to the TS and provides a data path to the VME Readout Buffers.

If the network path (ethernet) to the VRC is not available you can try accessing it via minicom (serial line) from b0dap10.

You can also reset the crate using the system reset lines in order to force it to reboot. Normally this should be tried only as a last resort.

Silicon System

The silicon system has a different architecture than the rest of the DAQ.

Trigger information from the TS is sent to the Silicon Read-out Controller at which point it is distributed to the rest of the silicon system.

The processor in the Silicon crates is used for configuration and monitoring - not used for readout.

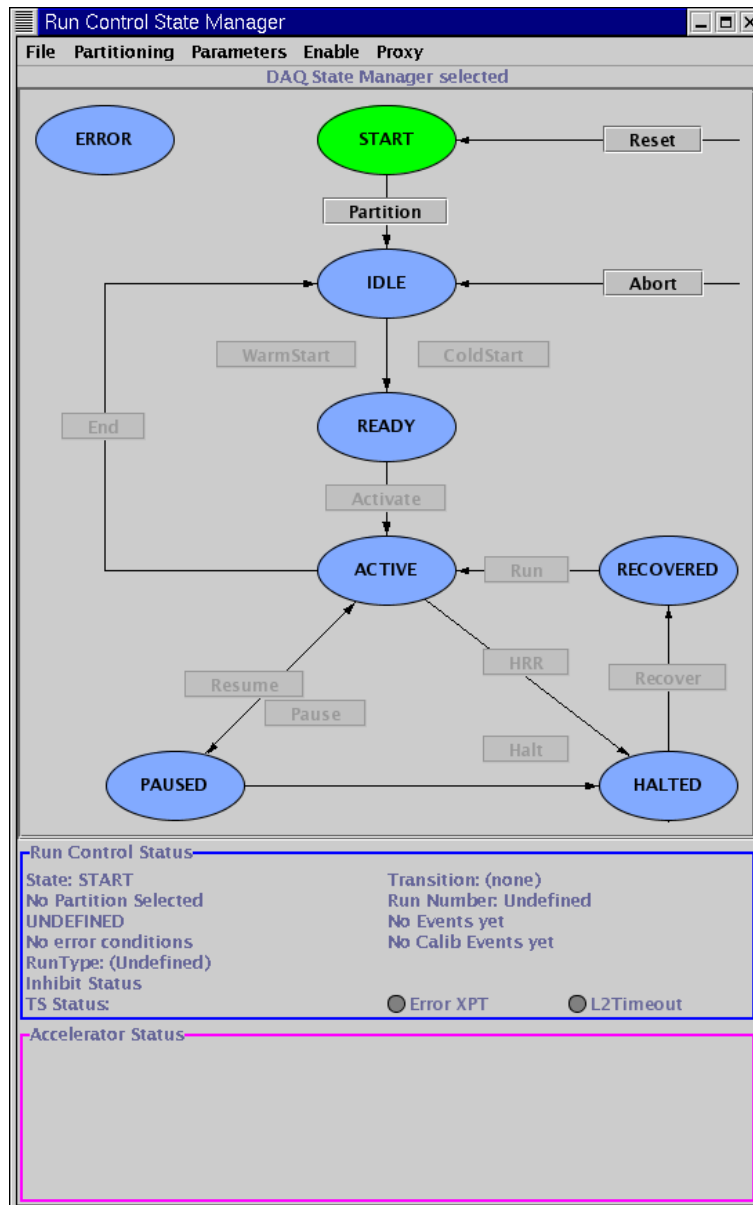
Data is transferred from the front end crates through the FIB crates to the VRB crates.

More details in a separate talk...

Run Control

Coordinates the configuration, starting and stopping of runs.

Written in Java, uses a Graphical User Interface showing a state transition diagram to control the many distributed clients.



Can group together clients into a *partition*. Can run with up to eight hardware partitions simultaneous.

Allows inclusion or exclusion of individual cards or crates, masking of bad channels...

Uses the commercial message passing software package smart-sockets.

Uses DaqMsg (layered on top of smartsockets) to provide automatic code generation to conveniently pack and unpack data structure (messages...).

Machine independent communication... clients written in Java running under Linux communicating with clients written in C running under VxWorks.

Clients subscribe to a subject and *configuration and control* messages are broadcast to all clients who are subscribed to a particular message.

Subjects have the syntax

/partition-0/frontEnd/ccal/00

Can use wildcarding to broadcast message to all clients of a certain type. Used for “run sequencing”, to bring a group of clients through a transition before a second group of clients.

All communication goes through the *rtserver*.

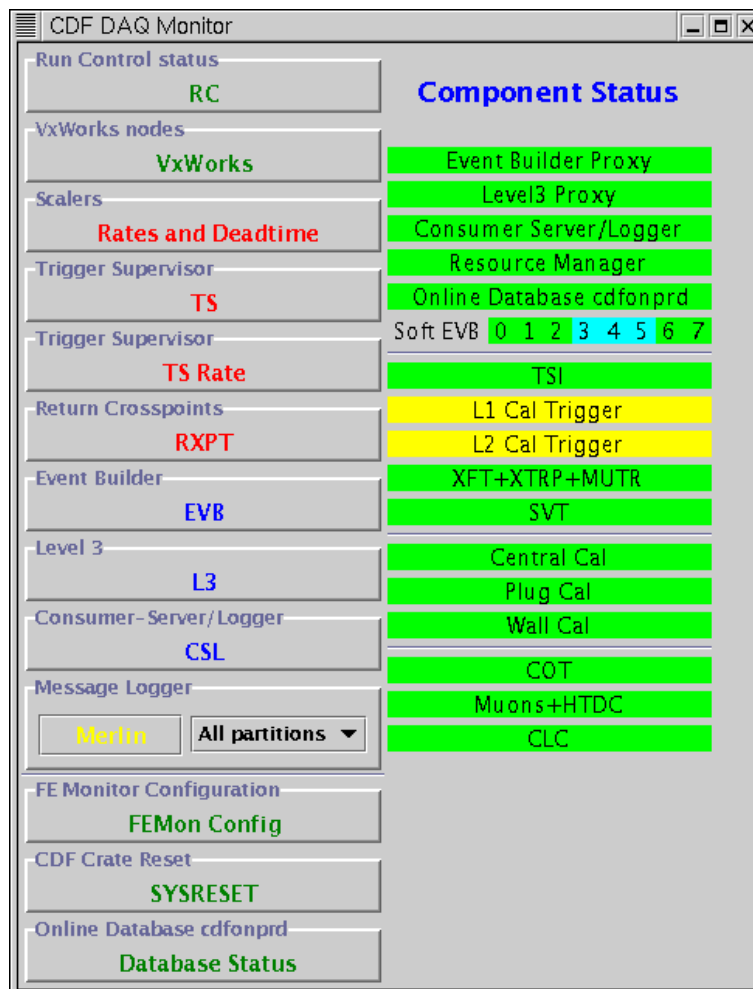
If the RC GUI crashes the run could still be going... and you can try reattaching a new RC to the current run.

More details in a separate talk...

DAQ Monitoring

There are a number of programs that can be used to monitor the performance of the DAQ. Can be launched from a main control panel...

- > setup fer
- > daqmon



These monitors are mostly used to check that data is flowing through the system.

The quality of the data is checked by the consumers.

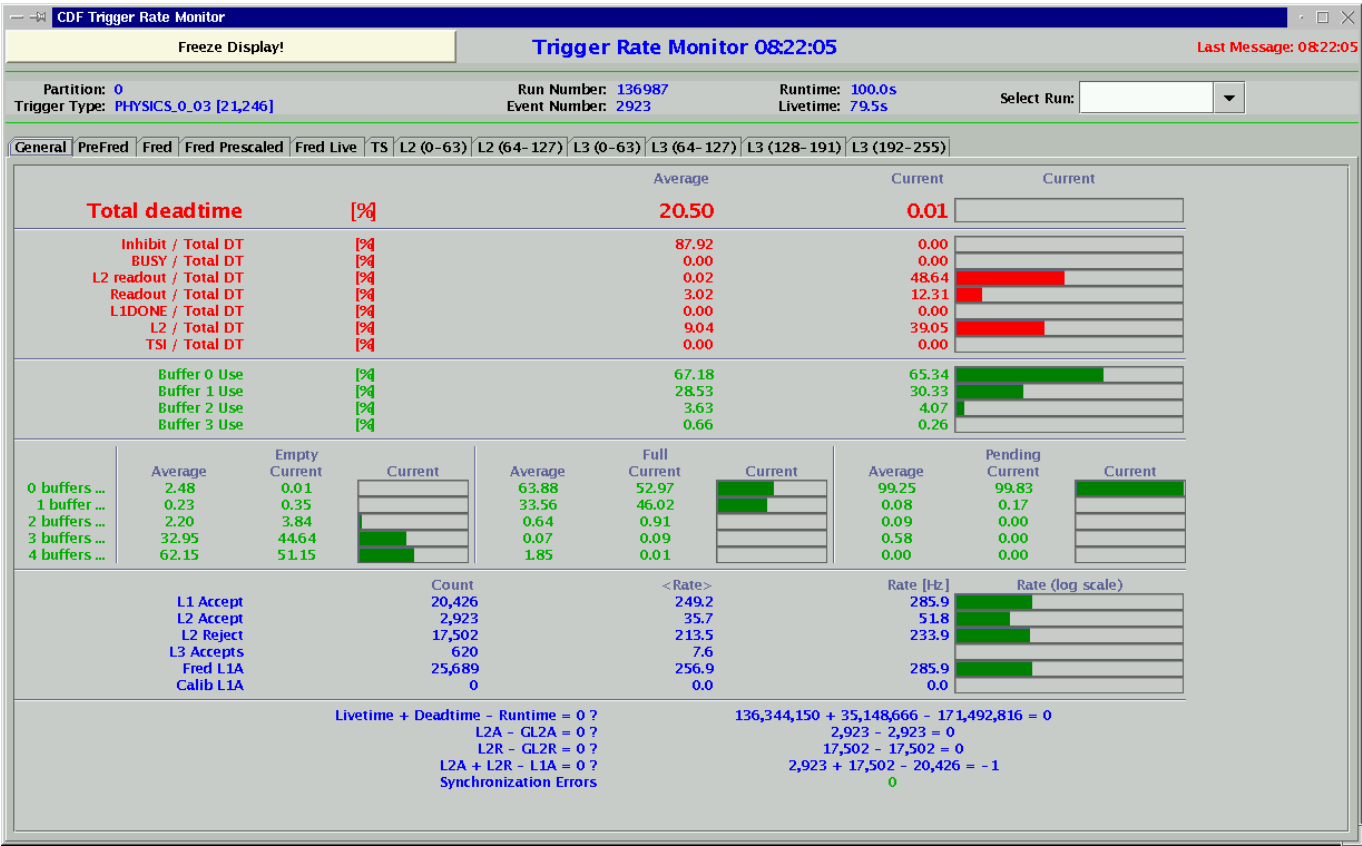
The more popular DAQ monitors are:

L3

Gives an overview of how L3 is working

Rates and Deadtime

General display...

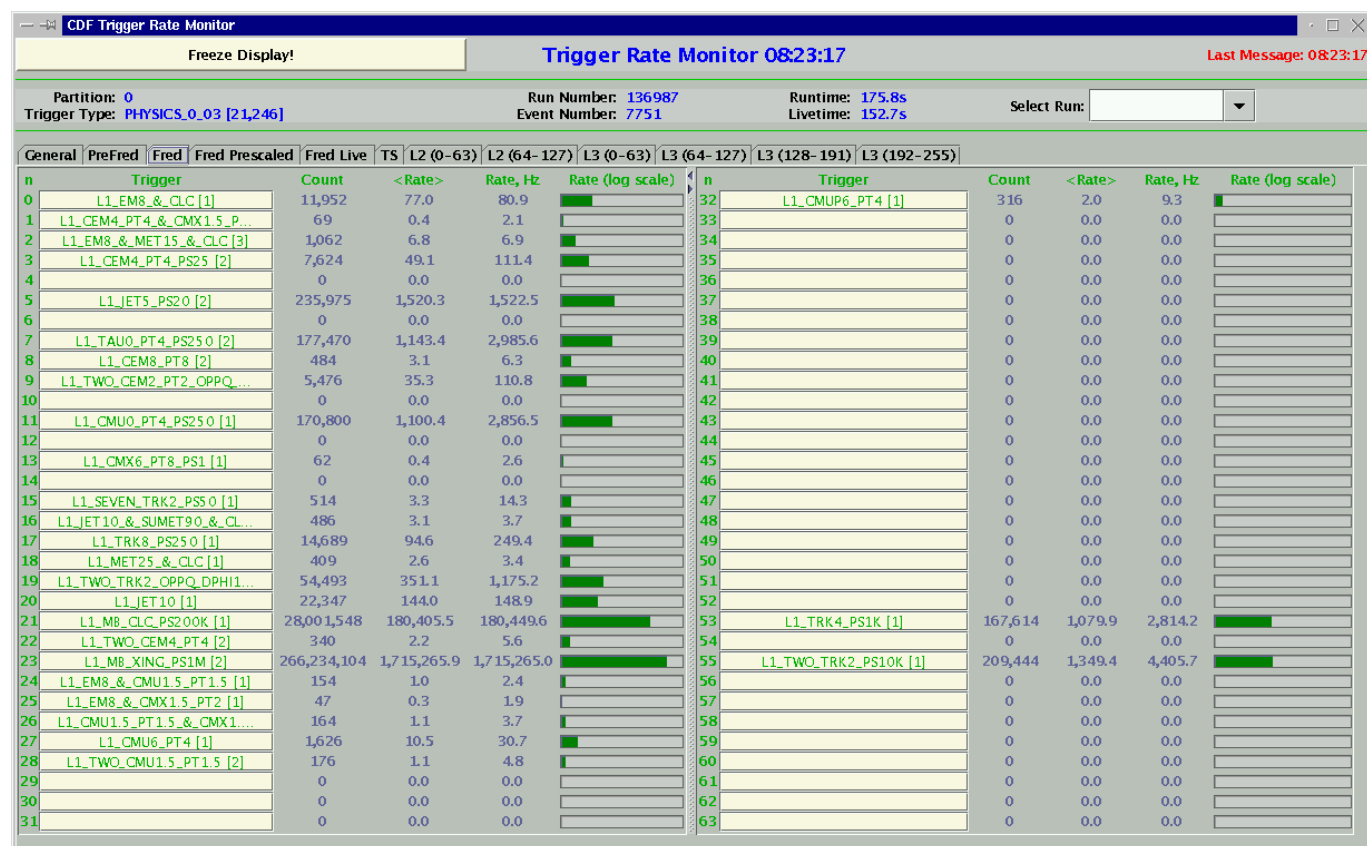


Useful to check that the trigger is properly functioning.

Shows the total system deadtime and how it is allocated.

Several tabed panels are available to give you a detailed look at the rates for each trigger at L1, L2 and L3.

Use one of the tabs to look at specific trigger rates in more detail...



→ Normally the physics triggers are defined so that the dead time is less than about 5%.

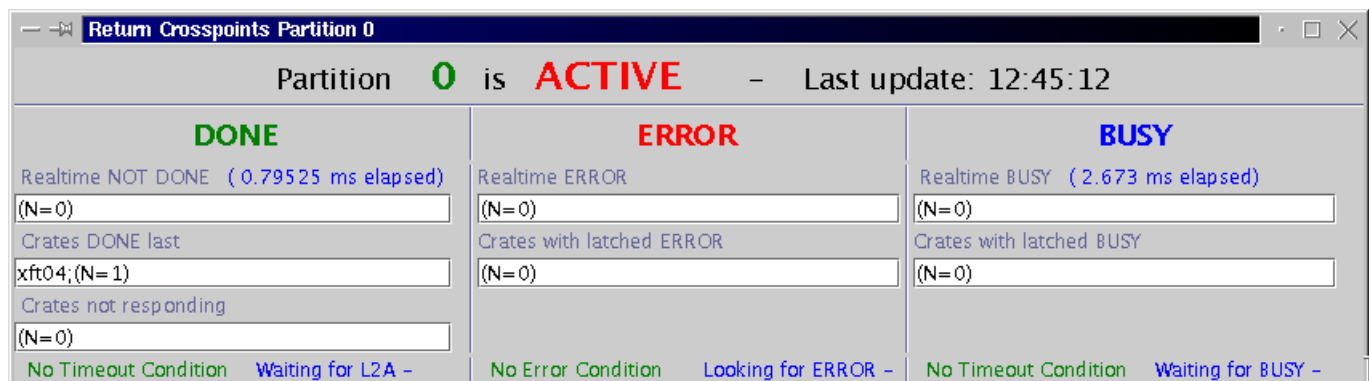
If you have a run going with high dead time this indicates a problem which needs to be fixed.

You can sometimes see which trigger is firing at a high rate from the “Rates and Deadtime” GUI.

RXTP

Shows which client was the last to return DONE, BUSY and ERROR and shows the time it took.

Useful to identify which crate is contributing to the deadtime.



In this example the XFT04 crate was the last to return a Done, and it was set 0.79 ms after the L2 decision was received.

→ Taking a long time to set the Done can result in "Readout Deadtime".

Typically a crate should set the done within 1 ms, but there are a few crates which can take longer.

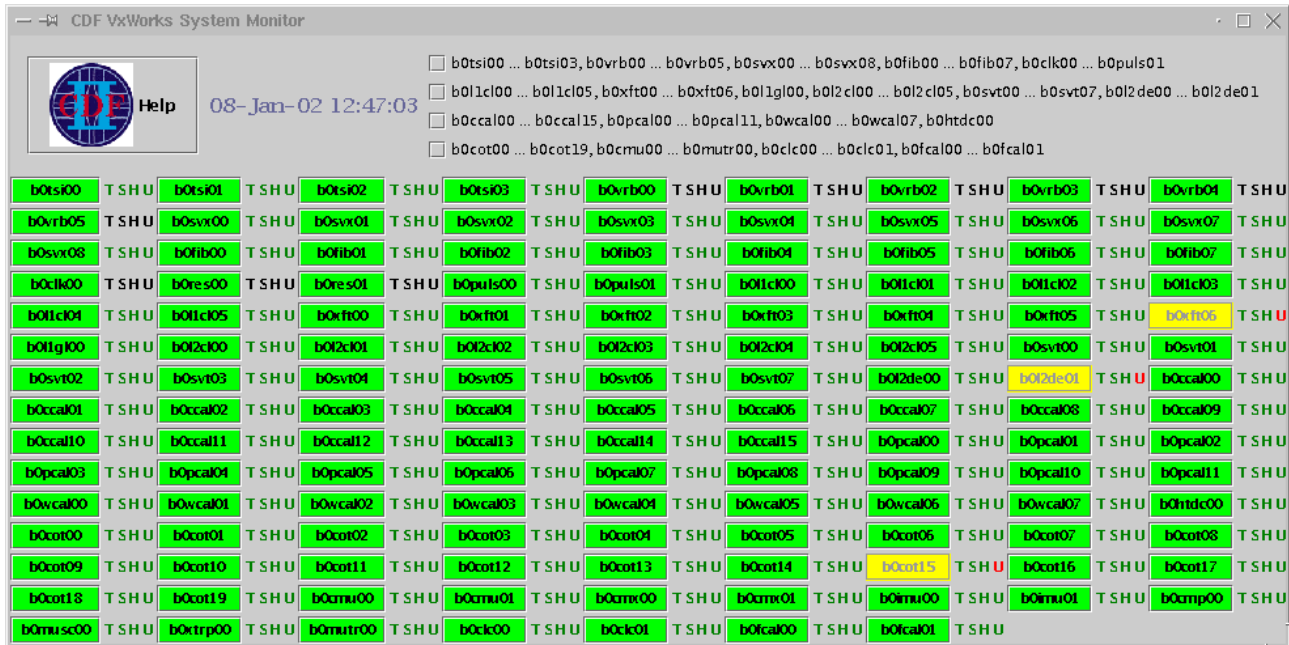
There is also a consumer (daqmon) that histograms the read-out times and event sizes, more later...

CSL

Shows the status of the CSL, logging rates, partitions etc...

VxWorks Monitor

The VxWorks monitor gives an overview of the status of the Front End crates in the system.



Each button corresponds to one of the front end crates.

Green indicates that the process is OK

Yellow indicates that the crate is not updating information

Red indicates that problem with the crate

Useful to see if a front end crate has crashed...

Error Handler

Error messages from the different clients are sent to the Error Handler, which displays the message on the screen and also logs the error messages.

After setting up the fer package, (setup fer) the environment variables for the error handler will be set.

The location of the error log file is:

`$ERRMON_LOGDIR/errorfile136574.log`

The interpretation of the error is done by the error handler, it is centralized so that the operator has one place to look.

Alerts the user of serious error conditions. Currently an orange window appears when there is a fatal error condition. Text message instructs the operator what to do.

In addition to the visual alert there is a voice alert which states the problem.

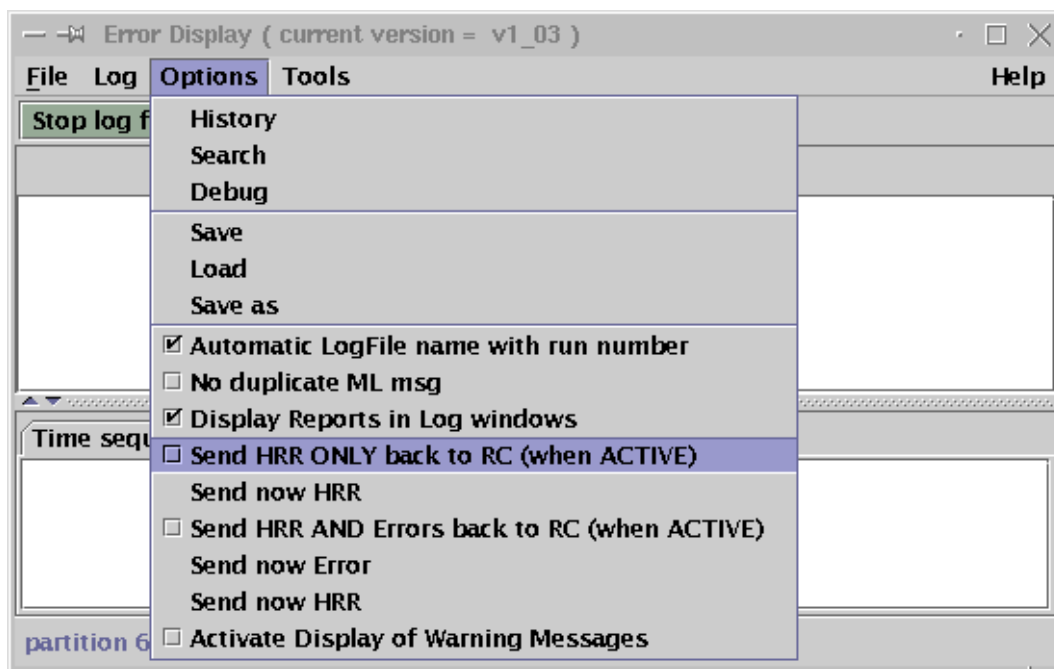
Can also be used to issue an automated Halt-Recover-Run sequence in the case of a Done or Busy timeout.

You should always be running with the automatic HRR enabled.

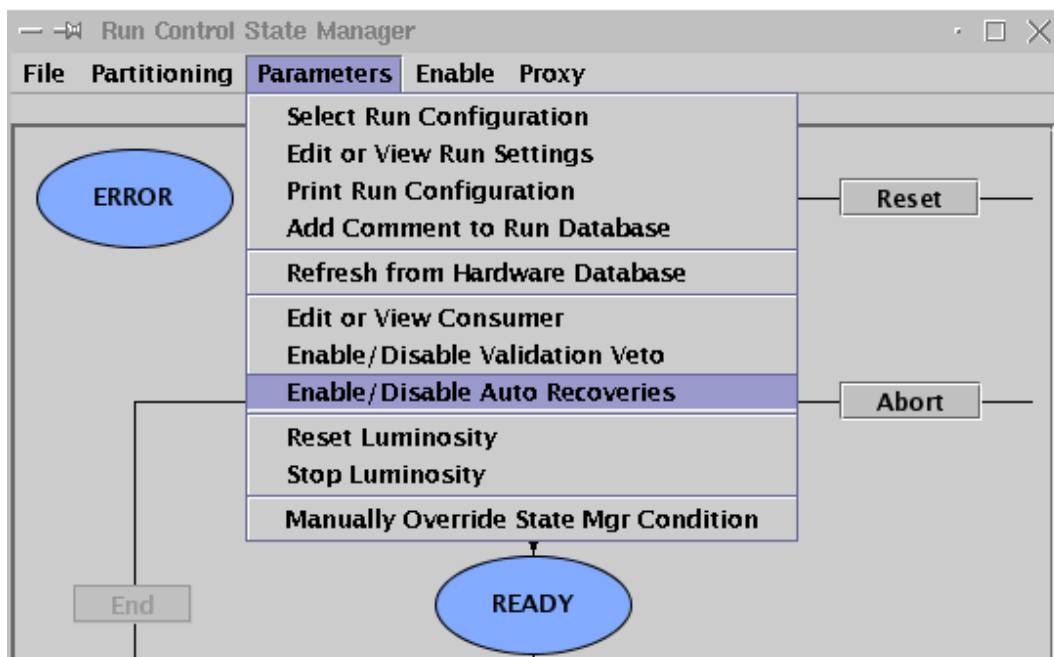
Report any problems with this feature in the shift log and send email to the RC email address:

`cdf-rc-support@fnal.gov`

You have to enable this option of sending commands from the error handler to RC.



and you have to enable RC to accept remote commands from the error handler.



Will build more intelligence into the error handler → expert system.

Level 3

Consists of a farm of dual processor PCs running Linux.

The raw data is complete and in the final data format when it gets to L3 and the offline reconstruction code is run to select events.

Reconstructed objects are added to the event record.

For example, using `Edm_ObjectLister` gives:

```
129  LRIH_StorableBank      (  1: LRIH,    1, 0) RAW
161  TFRD_StorableBank      ( 10: TFRD,    1, 0) RAW
...
7957 CalData                ( 47:    0,      0) L3
```

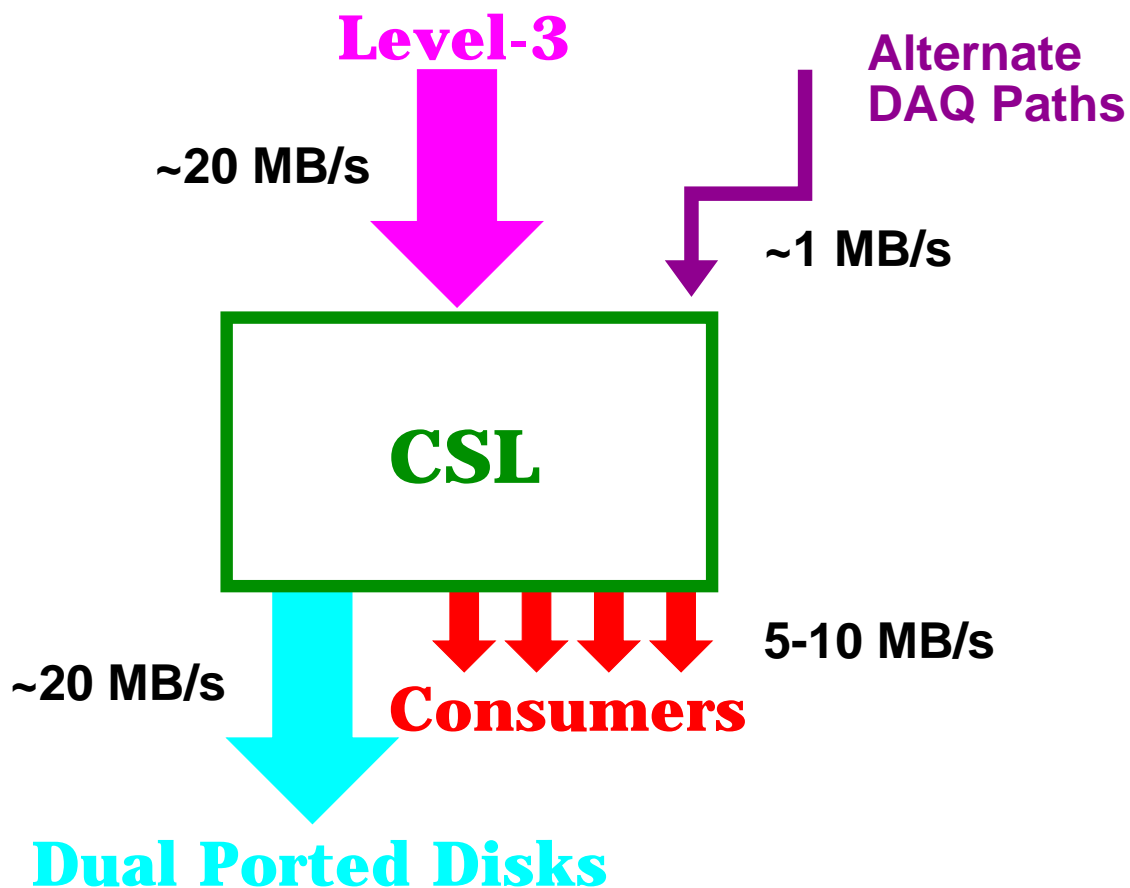
More details in a separate talk...

CSL

If an event passes a L3 trigger it is first sent to an output node then to the Consumer Server Logger (CSL).

The CSL distributes events to the various consumers which are used to check the quality of the data and the proper functioning of the trigger system.

The CSL writes data to disk in B0 separating it into different data streams based on the L3 trigger decision.



Data is copied from the disk buffers at B0 to the FCC disks then written to tape.

Important CDF DAQ Processes

Run control communicates with several key processes via so called proxy processes.

These processes are normally running but on rare occasions you may need to restart them.

In addition to these there are a number of other essential processes, for a summary see the “Important CDF DAQ Processes” link from the ace help page where you can find instructions on starting the processes.

SmartSockets b0dau30
Calibration Consumer Proxy b0dap62
Software EVB Proxy b0dap62
Resource Manager b0dap63
Consumer Monitor Proxy b0dap63
DBbroker Proxy b0dap63
L3Manager b0dap31
ACNET Monitor b0dap68
SVTSPYMON b0dap68
Consumer Server Logger b0dau32
Calibration Consumer b0dap60
Partition 14 Sender b0dap60

In addition there are

Consumer Disk Server b0dap65
Silicon Disk Server b0dap41

Consumers

Various consumers are used to check the quality of the data.

These are essentially AC++ modules compiled within the consumer framework used to monitor the quality of the data and the performance of the trigger.

Event Display

YMon

TrigMON

XMon

LumMon

Stage0

SiliMon

ObjectMon

BeamMon

L3RegionalMon

SVXMon

SVTMon

DAQMon

Used to identify hot channels (channels that are always on or are noisy), and dead regions (broken cables, high voltage problems...).

During shift operations there is a dedicated person (CO - Consumer Operator) assigned to look at the data quality.

Details in separate talk and at:

<http://www-b0.fnal.gov:8000/consumer/howto.html>

DAQMon Consumer

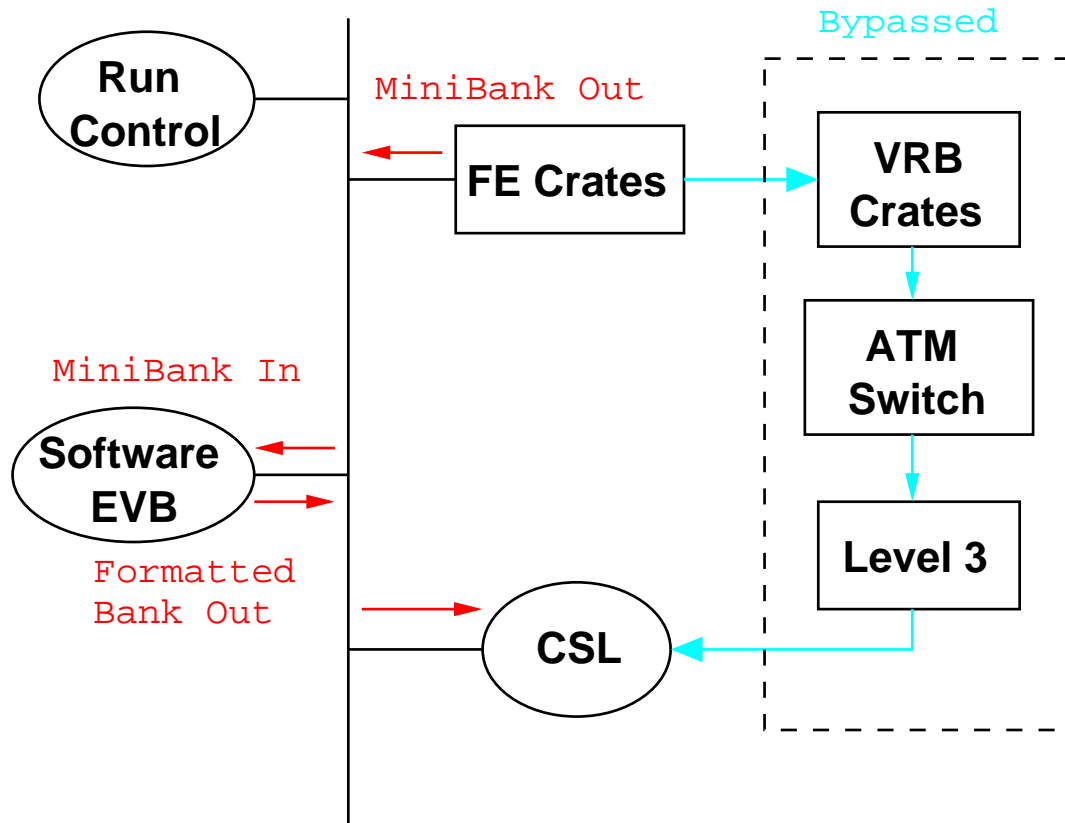
The DAQMon consumer plots the average readout time for each front end crate and the event size.

Noisy channels can sometimes lead to long readout times and large event fragments.



Software Event Builder

FE crates can send the mini banks over ethernet to a software client that collects the event fragments and reformats then into the final data format.



Events are sent to the CSL and can be distributed to the consumers or written to disk.

Used for debugging parts of the system and for calibrations.

Depending on how much data is being read out the rates can range from a few Hz to a few tens of Hz.

More details at:

<http://www-b0.fnal.gov:8000/ace2help/sevb/>

Calibrations

Calibrations for the different subsystems are also performed using Run Control.

The set of calibrations is part of the ace's duties.

Typically the software event builder is used for calibrations. This can accommodate larger event sizes.

Calibration data is sent to a *calibration consumer* which writes the results to a database.

Can view the results of the after being written into the database using **DBANA**.

Calibrations include:

Calorimeter - QIE, ShowerMax, LED and Xenon, Laser
CLC, COT, Silicon, Muon, TOF, BSC...

Details can be found at:

http://www-b0.fnal.gov:8000/ace2help/ace_calibrations.html

Also in a separate talk...

Dead Time

More details about the sources of deadtime and how to identify the source can be found at:

<http://www-b0.fnal.gov:8000/ace2help/deadtime.html>

The rate limit into the EVB is about 375 Hz. The logging rate limit of the CSL is 20 MB/s which corresponds to about 75 Hz.

Actual rates depend on the data volume, number of clients in the run and detector occupancy.

Normally the trigger tables are defined such that the dead time is less than 5%.

If the dead time is higher than $\sim 5\%$ then the source needs to be identified.

From the *DaqMon Rates and Deadtime* display you can see the total dead time of the system and the fraction from various sources.

The most common type of deadtime you will encounter are from “Busy” and “Readout”.

Busy

This indicates that the VRB buffers are full and cannot accept more data.

Either the L3 accept rate is too high (faulty trigger) and we are limited by the 20 MB/s CSL rate, it is taking too long to process events at L3 or it is taking too long to read in the events or L3.

If the L3 display (one of the DAQ monitors) is “mostly green” this indicates that the processors are mostly occupied by trying to *output* the events to the CSL.

Check the CSL logging rate, if it is around 20 MB/s it may indicate that a L1 or L2 trigger is firing at too high of a rate.

One of the disks that the CSL buffers data onto is a slow disk and when writing to it we see logging rates of 15 MB/s.

A L3 display that is mostly “dark blue” indicates that the processors are busy *processing* the event. So far we have not been limited by the processing capacity of L3.

A L3 display that is mostly “light blue” indicates that the processors are busy *inputting* events. A BUSY for this case may occur if the event size is very large, for example noisy channels can lead to large events...

Readout

Readout deadtime occurs when the FE processors are taking too long to readout the event.

Many systems have a fixed data size, however for some the data volume increases with increasing luminosity.

For the TDCs the DSP processing time also increases with the number of “hits” for a channel.

→ A typical source of readout deadtime is high occupancies for the TDCs which occurs when some channels are oscillating resulting in many “hits”. The TDC DSP cannot process events fast enough...

One can identify the “bad guy” by using the RXPT monitor to see which crate shows up as the last to return DONE.

L2 Deadtime

L2 or Readout Deadtime

At a L1 accept rate of about 3.5 KHz and a L2 accept rate of about 250 Hz we have seen a dead time of about 2% due to a combination of “L2” and “L2 or Readout”.

This is believed to be the result of the way buffers are managed by L2 which effectively reduces the number of available buffers from four to three.

Typical Warnings/Errors

Warning: COT Truncated Data

For very high occupancy events or when there is noise on a channel the data coming from one of the COT crates can be larger than what can be held in the VRB buffer.

In this case we truncate the data and you will get an error message of the type:

```
(MLE) b0cot14:5:37:25 AM->Runtime Error 1, Event 4793: data truncated  
(MLE) b0cot02:5:54:23 AM->Runtime Error 2, Event 53148: data truncated
```

Warning: Bunch counter mismatch

Each front end card is checked that the BC is consistent. If there is a mismatch this warning will be sent.

For some crates this is a known problem and we do not try to go through a HRR sequence since the problem is cleared on the next event.

In other crates this problem is serious and will result in a done timeout. In this case we do issue a HRR to recover.

Warning: Reformatter Errors

Events with corrupted data fragments cannot be assembled into an event and are rejected by the reformatter process.

If the instantaneous rate of reformatter errors (measured over 30 seconds) is greater than 1% the error handler will pop up a warning message.

In this case follow the instructions on the window.

Reformatter errors are usually the result of corrupted silicon data and if they persist the offending wedge may have to be removed by an expert.

Error: Done Timeout

If an error is detected in the front end crate the process may not set the “done” bit generating a done timeout.

The run can be recovered by going through the Halt Recover Run sequence.

→ This type of error is detected by the error handler and an automatic HRR is issued.

Error: Busy Timeout

Busy timeout occurs if the VRB data buffer is not emptied out fast enough and the front end process cannot send data to the VRB.

This type of error can be triggered by several causes.

→ This type of error is detected by the error handler and an automatic HRR is issued.

Error: On Transition

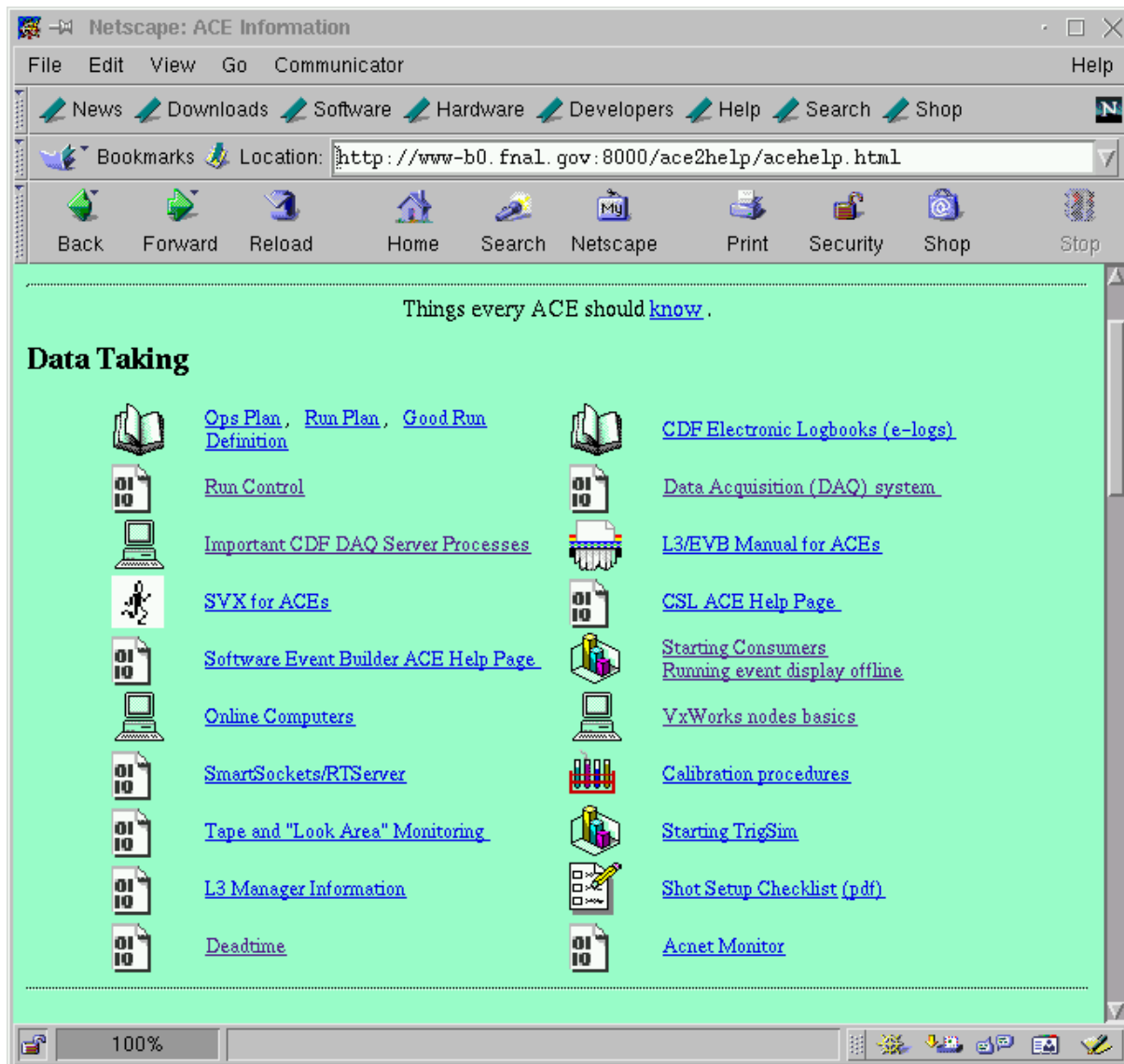
A transition can fail if there is a problem initializing the front end electronics.

One typical error during a transition is: “Error Initializing HDI”.

In this case one has to try the coldstart transition again.

Documentation

Many useful links to detailed documentation can be found on the Ace Help page: <http://www-b0.fnal.gov:8000/ace2help/>



Links to past Ace Training talks can be found there.

Many figures in this talk were lifted from previous talks...

Triggers and Scalers

- 1 What are the scalers?
 - The scalers are banks of counters with VME readout. These hardware scalers do the TSI accounting.
 - Level 1 trigger rates (GFRED gated)
 - Livetime/Deadtime accounting
 - Buffer occupancy, etc.
 - There are also ‘software’ scalers from L2 and L3.
 - Level 1 trigger rates (GLIVE gated)
 - Level 2 trigger rates
 - Level 3 trigger rates

2 What is Deadtime?

- Deadtime occurs when the Trigger Supervisor must send a Level 1 Reject regardless of what the trigger tells it to do
- Deadtime ($> 5\%$) is bad!

3 Deadtime/Livetime accounting

- Input signals to Deadtime/Livetime accounting include
 - CDF_CLK - the basic unit of time
 - CDF_BC - gate indicating a filled crossing
 - CDF_ABORT - gate marking crossings in the abort gap
 - BUSY - from the VRBs via the TRACER
 - INHIBIT - Trigger inhibit
 - TS_RUN - as in Halt/Recover/Run
 - TS_PAUSE - from PAUSE button on run-Control panel
 - L2BF_EMPTY - Internal TS signal marker indicating at least one free L2 buffer

- Definition of Deadtime/Livetime Signals
 - Runtime Gate: $GRUN = TS_RUN * \overline{TS_PAUSE} * CDF_BC * \overline{CDF_ABORT}$
 - Livetime Gate: $GLIVE = GRUN * L2BF_EMPTY * \overline{INHIBIT}$

and ...

- Fredtime Gate: $GFRED = GRUN * \overline{INHIBIT}$
- Accounting signals
 - $RUN_TIME = GRUN * CDF_CLK$:
Counts each filled beam crossing the DAQ is enabled to run
 - $LIVE_TIME = GLIVE * CDF_CLK$:
Counts each filled beam crossing the DAQ is enabled to run and is not forced to send Level 1 Rejects

4 Sources of Deadtime

- INHIBIT_DEAD: Usually an HV trip.
- No Free Level 2 Buffers
 - BUSY_DEAD: A VRB is filling up. Check EVB status
 - L1DONE_DEAD: Waiting for L1_DONE from SRC. Check Silicon status.
 - L2_DEAD: All 4 buffers full. Waiting for L2 decision from alpha. Page Level 2 expert.
 - READOUT_DEAD: 4 L2 Accepts issued. Front-end crate(s) slow to be DONE. Find slow crate with RXPT monitor. Usually bad FE card or bad FE code.
 - L2_READOUT_DEAD: One buffer being read out, other 3 waiting L2 decision. This is rare..
 - TSI_DEADTIME. Time lost due to TS book-keeping. Very rare. Contact expert.
- Level 2 Buffers will fill up if the L1 Accept rate

is too high.

- Trigger Rates and Deadtimes can be monitored
 - DAQMon “Rates and Deadtimes” panel
 - XMon, a consumer process
 - The Run Summary web page

Trigger Inhibits

Jonathan Lewis

Ace Training

Updated June 2002

Overview

- **Trigger inhibits implemented using commercial modules**
 - **NIM and Camac logic in 1RR12D**
- **16 primary inputs.**
 - **can be masked individually from RunControl**
 - **Controlled from muon scintillator camac**
 - **Must include b0musc00 in a run to use inhibits**
 - **OR of the inputs sent to the Global Level 2 board in the Trigger Supervisor crate**
 - **Status on LED panel above Ace console**

Overview, 2

- **Two classes of inputs:**
 - Signals from the FIX MCS control system
 - Includes trips, but takes seconds(?) to reach inhibit
 - Can be masked separately from iFix
 - Fast trip signals from power supplies
 - msec time scale
 - minimize chance of corrupt data
 - Most common source of inhibit
- **Logic:**
 - $TI_i = (iFix_i + Trip_i) * Mask_i$
- **Some inputs direct from iFix, others require some NIM logic**

iFix Inputs

- **Specify status of particular components.**
 - limited number of inhibit channels
 - divide separate functions within a system to separate MCS output channel
 - combine elements for one piece of experiment from various monitors
 - **Example: CCAL includes**
 - PMT HV
 - CES HV
 - CES LV
- **Key idea:**
 - **Everything should be green on the inhibits iFix page**

Inhibit channel assignments

- **0 Solenoid**
- **1 SVX**
- **2 ISL**
- **3 COT**
- **4 TOF**
- **5 Central Calorimeter**
- **6 Plug Calorimeter**
- **7 Central Muon (CMU, CMX, CMP)**
- **8 IMU**
- **9 CLC**
- **10 L00**
- **11 TeV Events**
- **12 [unassigned]**
- **13 Rack Protection**
- **14 VME Power Supplies**
- **15 [unassigned]**

Summary of iFix Signals

Channel	Tag	Computer
1	SVX_HV	svxiicon
2	ISL_HV	svxiicon
3	COT_HV	cot2
4	COT_LV	cot2
5	TOF_HV	tof1
6	TOF_LV	tof1
7	CENTRAL_HV	pisabox
8	CES_HV	muon3
9	CES_LV	voltman
10	XENON_OFF	pisabox
11	PLUG_HV	cdfephv
12	PES_LV	voltman
13	MUON_HV	muon3
14	MUON_LV	voltman
15	CSP_CSX	cdfccu
16	IMU_HV	muon3
17	IMU_LV	voltman
18	CLC_HV	clc
19	RACKS	cdf_s3
20	VME_POWER	voltman
21	CSP_CCU	cdfccu
22	IMU_CCU	cdfccu
23	L00_HV	svxiicon

Trigger Tables

Jonathan Lewis

Ace Training

Updated June 2002

What's in a Name

- **PHYSICS_1_01[10,71,301]**
 - **Table name**
 - “1_01” is administrative major version
 - **Table version**
 - Name and version specify physics content
 - **Level 2 tag set**
 - CVS tags of Level 2 alpha code
 - Tied to physics table
 - **Level 3 tag set**
 - Level 3 executable, tcl and calibration set
 - Exe build driven from table
 - Code is base release plus a patch list

Building and Testing

- **Table built with database GUI by trigger drones**
 - GUI instruction is on need-to-know basis
 - GUI performs consistency checks and builds L2 exe
 - Assigns L2 tagset
- **L3 gang builds tcl and exe**
 - Usually 1-2 hours
- **Initial test without beam**
 - This means no HEP colliding beam
 - Studies, injection, etc. are OK
- **Beam test usually at end of store**
 - Minimize integrated luminosity
- **If gurus approve, will make it default on the white board**

Building and Testing, 2

- Have ability to change L2 and L3 executables without new physics table
 - Fix bugs
 - Improve low-level code
- Occasionally will test new L2 or L3 tagset for existing table
- May subsequently change defaults
- For table (physics) changes, usually have round of PHYSICS_TEST tables before copying to PHYSICS
 - Attempt to limit confusion later

Decoupled Tables

- In usual mode of operation, Level 3 is driven by Level 2 decisions
 - Explicit paths
- For non-physics tables, can have Level 3 process all events the same way
 - Use for cosmics, L1/L2 tests, etc.
 - One tagset can be used for many tables
 - Usually have two current
 - Null
 - All reconstruction
 - Single output stream only
- Decoupled tables use different RunControl menu from physics tables

RadMon for Aces and SciCos

- How it works
- How to respond to automated aborts and alarms
- How to manually abort the TeVatron
- Summary – your responsibilities

The Hardware

- On either side of beampipe @ $z = \pm 4.3$ m sits a Beam Loss Monitor (four total)
- BLM signal (prop. to *dose rate*) amplified and digitized in CAMAC modules in control room
- Signal compared with preset thresholds; if too high, drop 5V enable to TeVatron
- Signal also integrated to keep a record of accumulated dose

Monitoring – ACNET E20

E20

SVX Rad Scaler Readout

◆Pgm_Tools◆

*Global Reset

*Plot FIFO
*Select Display Options
*Display Logged Data
Fifos Recording

	Rate (R/s)	Sum (Rads)
W Inner BLM	0	.0378
W Outer BLM	0	0
E Inner BLM	0	4.192
E Outer BLM	0	3.189

Messages

Welcome to the SVX Loss Monitor Page

Monitoring – Fast Time Plots

- Keep a Fast Time Plot of the **integrated dose** going at all times on the ACNET terminal
- Just click on “SVX” on the E-Z Writer page (E11)
- The four integrated BLM doses are E:SVRAD0 – E:SVRAD3

Alarms and Aborts

- **Automated** aborts triggered by high *dose rates* – 12 rad/s
- **Manual** aborts triggered by high *integrated doses* – thresholds depend on what MCR is currently doing (shots, stores, or studies)
- If more than 18 rad collected in past minute, an **automated integrated dose alarm** will sound – start paying close attention to integrated doses (E20 or FTP) in case you have to manually abort

Manual Aborts

- Three successively higher thresholds (~krad, posted by ACNET terminal) must be crossed before you trigger a manual abort
 1. **CDF Manual Alarm** – SciCo alerts MCR
 2. **MCR Manual Abort** – MCR aborts beam
 3. **CDF Manual Abort** – SciCo aborts beam

...ultimately, safety of SVX is in OUR hands!

How to Manually Abort

- In lieu of crash button, manual aborts effected by *lowering automated abort threshold to below pedestal*
 1. Go to ACNET E48, click on “335”
 2. E:SVBLA1 – change yellow number to 10, click “CAUTION!” to confirm
 3. E:SVBTA1 – change yellow number to 10, click “CAUTION!” to confirm

Recovering from Aborts

- All spelled out in CDF procedure 106 – read it!
 1. Silence sono-alarm
 2. Page RDCO, CDF Ops Manager
 3. Once Ops Manager gives the OK, reset the abort hardware (see web pages)
 4. Make an e-log entry, of course

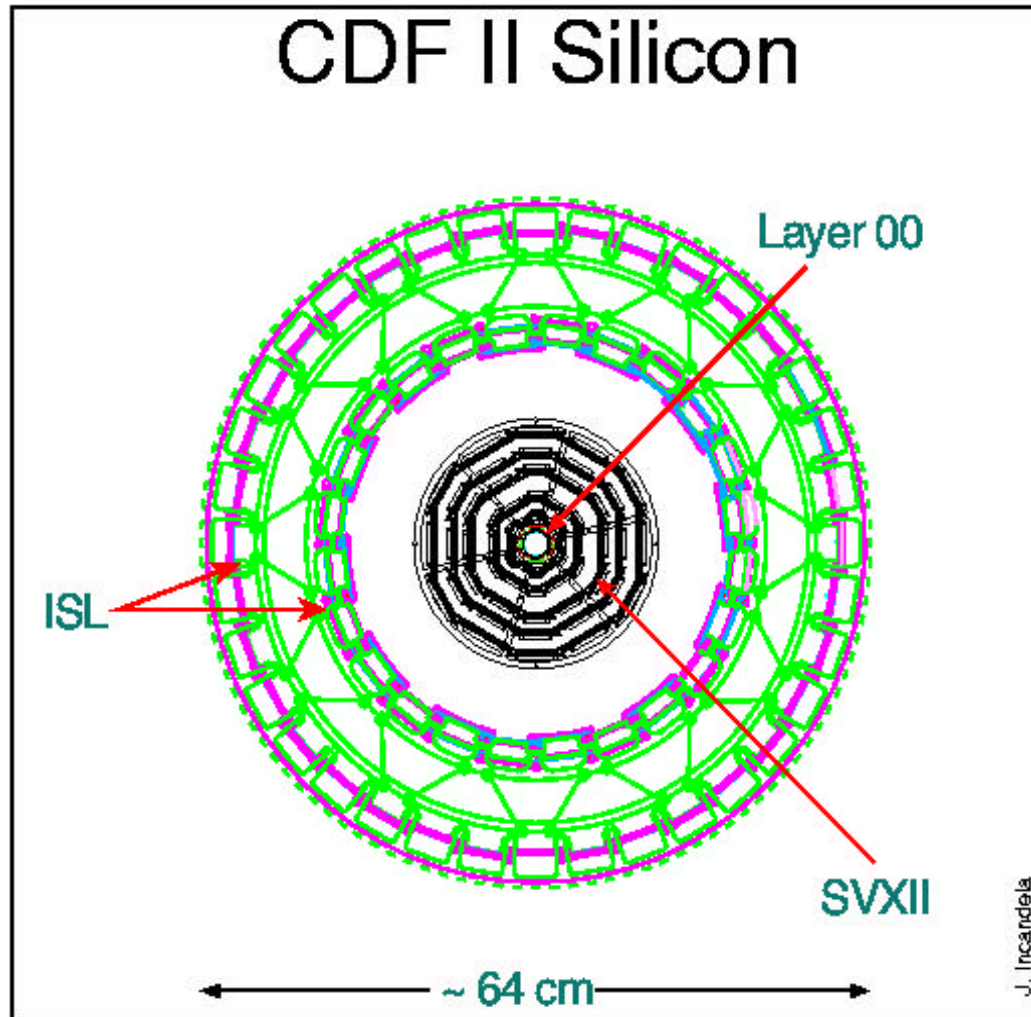
Summary

- Page RDCO if any kind of alarm, abort, or something seems awry
- If any E:SVRAD* activity during your shift, put an ACNET summary plot in e-log
- Constantly monitor E:SVRAD* whenever beam in TeVatron; during high losses, be checking against the manual alarm/abort thresholds
- SciCo should alert MCR when high losses seen
- Further reading: CDF PROC 106 and the RadMon web pages (linked from Monitoring Global page)

What *You* should know about the Silicon

- Introduction
- Monitoring
- Problems
- Responsibilities

Introduction



- L00 (1 layer)
 - $R = 1.35\text{-}1.65\text{ cm}$
 - 13824 channels
- SVX (5 layers)
 - $R = 2.5\text{-}10.6\text{ cm}$
 - 405504 channels
- ISL (2 layers)
 - $R = 20\text{-}28\text{ cm}$
 - 303104 channels

Total: 722432 chnls

➤ Share same DAQ architecture

Introduction

The silicon detector can be permanently damaged by:

- A. Powering (STDBY or ON) without adequate cooling
- B. Large charge deposits (from unstable beam) while ON
- C. Incorrectly powering

We minimize chances of incurring such damage by:

- A. Employing PLCs to monitor status of silicon cooling
- B. Employing various loss monitors to determine beam stability
- C. Employing “clever” monitoring/control software

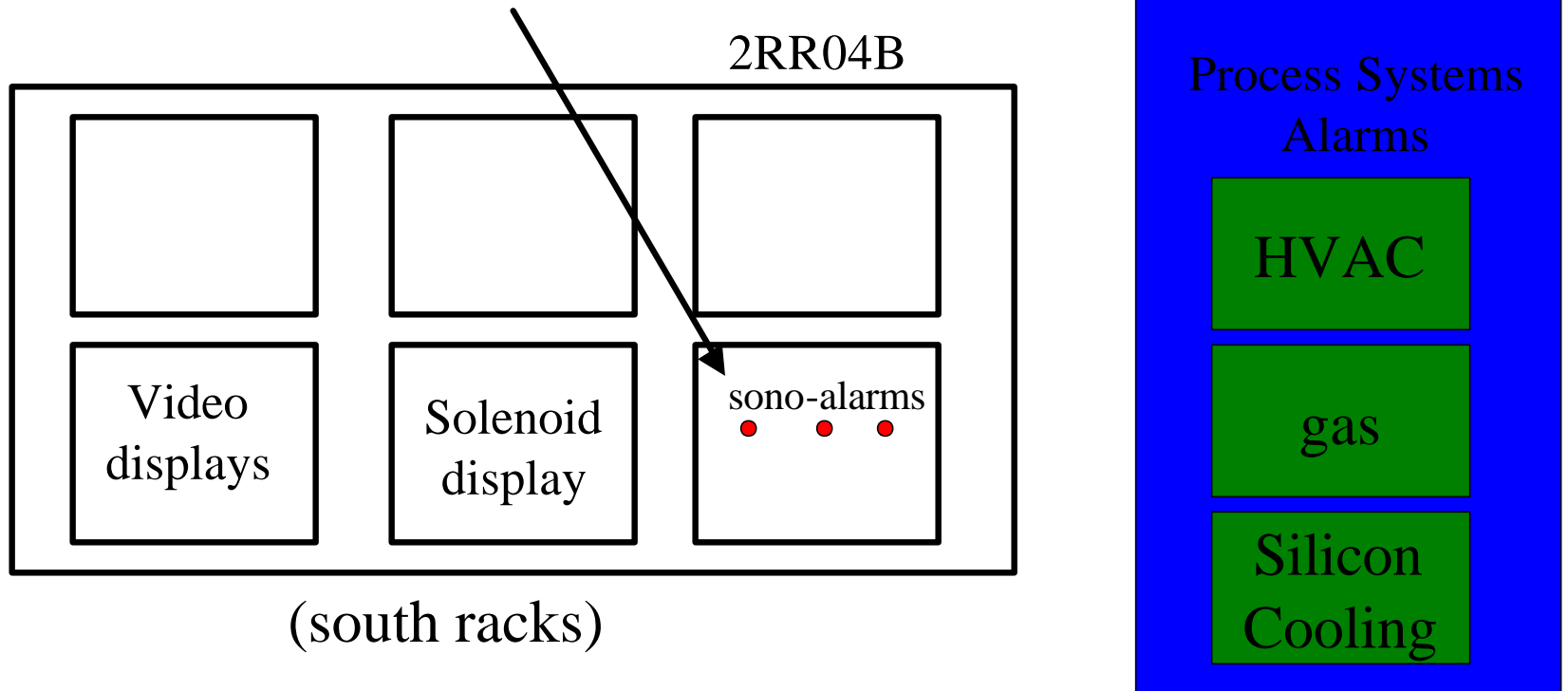
And as a final mitigating factor:

We rely on YOU to help quickly spot potential dangers.

Monitoring

There is information available from a variety of places:

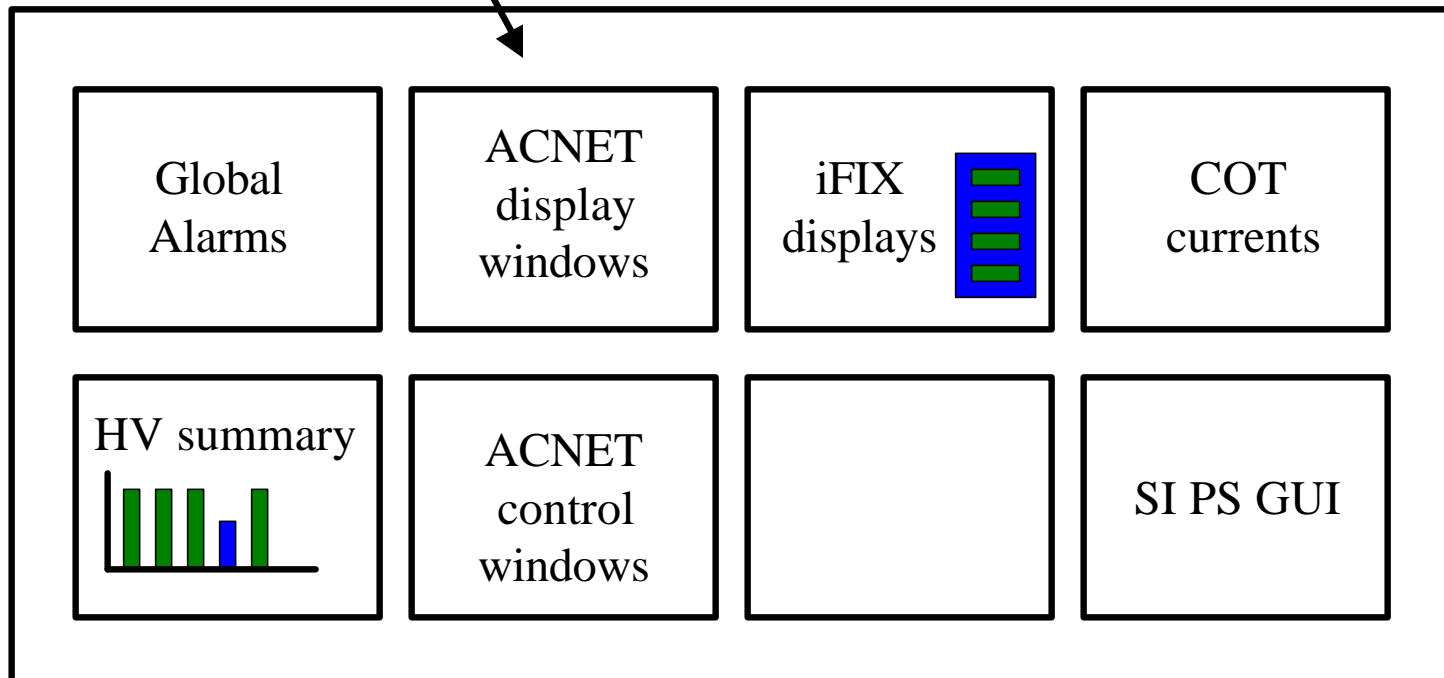
- A. Silicon Cooling... overall status from
- "Process Systems Alarms" summary
 - Sono-Alarms



Monitoring

B. Beam losses from ACNET

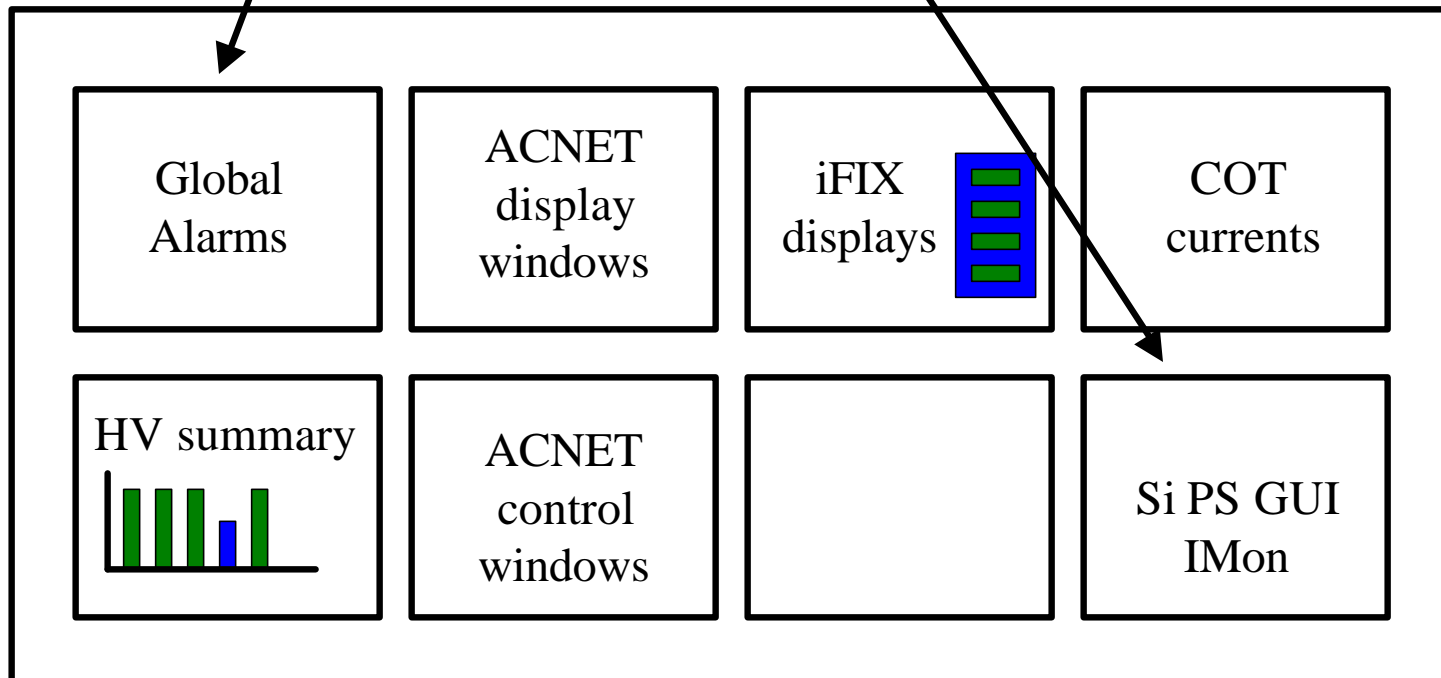
- LOSTP and LOSTPB
- SVXRAD plots



Monitoring

C. Power status

- Silicon Power Supply Control GUI
- HV Summary and Global Alarms



Monitoring

I F  .and. 

- Cooling in good shape

I F LOSTP/LOSTPB <30 kHz/each .and. no spikes >40 kHz
.and. SVXRAD flat

- TeV beams are stable

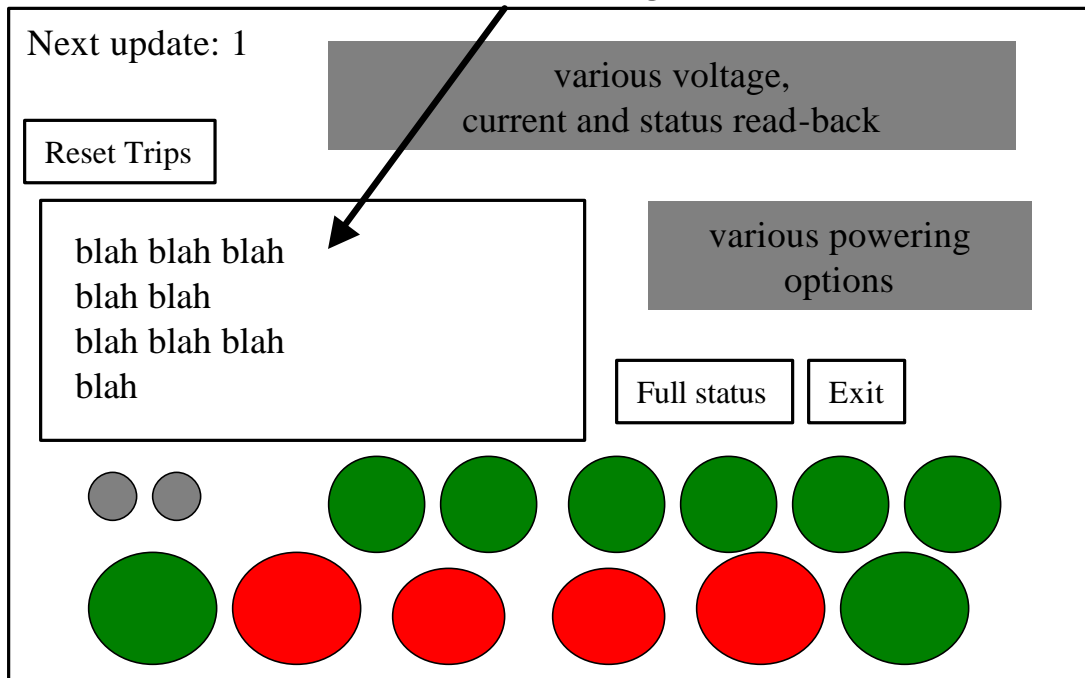
I F  .and.  .and.  on Global Alarms Sum'ry

- Powered wedges OK

Problems

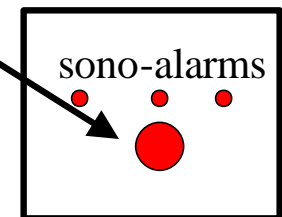


- Page 218.8227 (main pgr)
- Page 218.8626 (interlock pgr)
- Check GUI message window...



I F persistent (1 or 2 ok)
"ALERT" .or. "I LLEGAL"
messages (check time stamp):

Hit the Silicon Rack Power
Crash Button

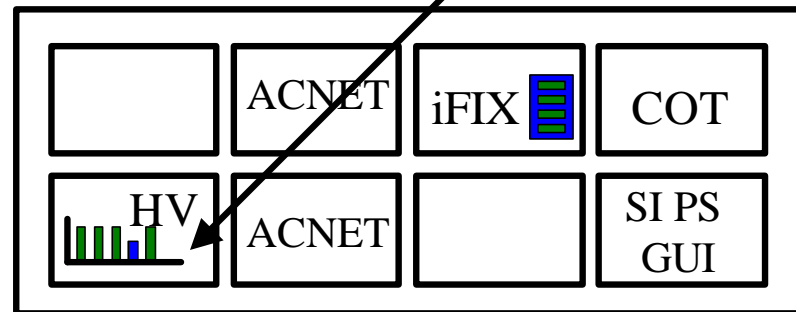


Problems

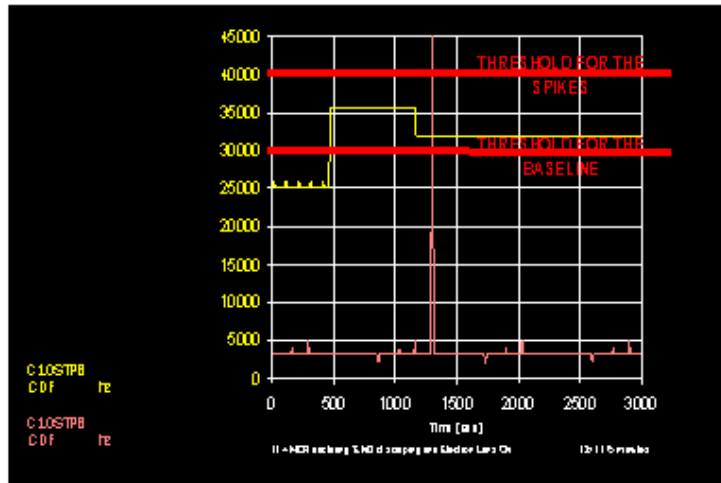
For SVXRAD plots, follow RADMon run rules

If either LOSTP or LOSTPB >30 kHz .or. spikes >40 kHz *or otherwise indicate unstable beam conditions*
(during shift, use lumberjack plotter to track history of losses over course of present store) :

- Ask SciCo to notify MCR (nearly always results in marked improvement within about 30-40 minutes)
- If losses persist, or worsen: page 218.8227
- If you fear for safety of silicon: use HV Summary button to bring to STDBY (will take few minutes)



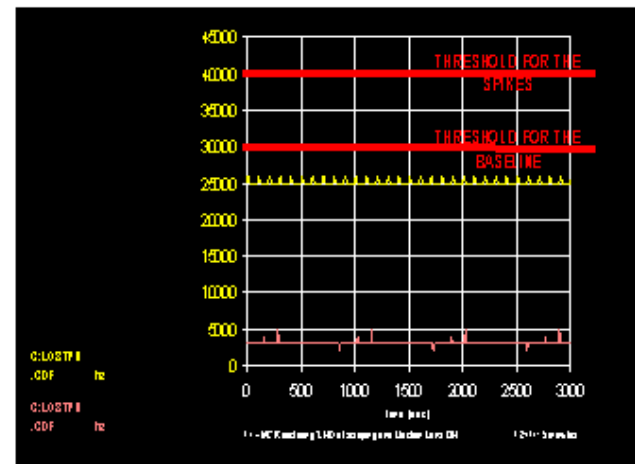
Know Losses Policy (Posted in CR)



Silicon LOSS Policy

BAD LOSSES
Baseline bigger than 30,000 Hz
OR
Spikes Bigger than 40,000 Hz

GOOD LOSSES (at least 5 minutes)
Baseline smaller than 30,000 Hz
AND
Spikes Smaller than 40,000Hz



Problems

I F **L00** .or. **SVX** .or. **ISL** on Global Alarms Sum'ry

- Sometimes will clear themselves... otherwise:
- Page 218.8227
- expert will either take care of it themselves, or, they may coach the Monitoring Ace through recovery

I F SI PS GUI stops Updating:

- Occasionally (1-2/shift) check that "Update" is counting down
- Be patient, gets "stuck" on "1" for 5-10s sometimes
- If recently changed voltage state (e.g. turned to STBY or ON), wait ~5 minutes and check again
- If really "stuck", follow directions to restart (they're taped above the GUI screen)

Quick SI -PS-GUI Tutorial

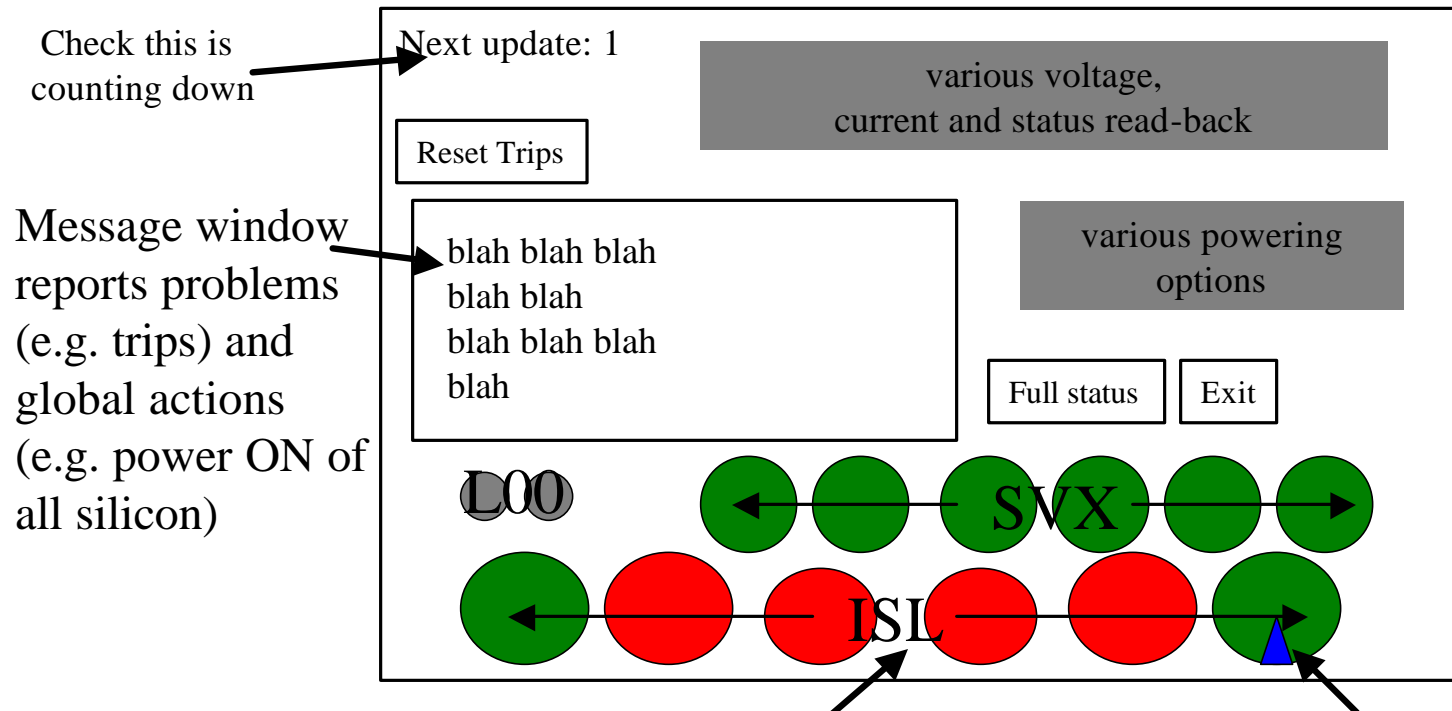
Labels: DBbWw-Ll (e.g. SB2W3-L3 = SVX brl-2 wdg-3 lyr-3)

D: S=SVX, I=ISL, L=L00

B: barrel number (0-5)

W: wedge number (0-11)

L: layer number (0-4)



Only use GUI
when coached
by expert!

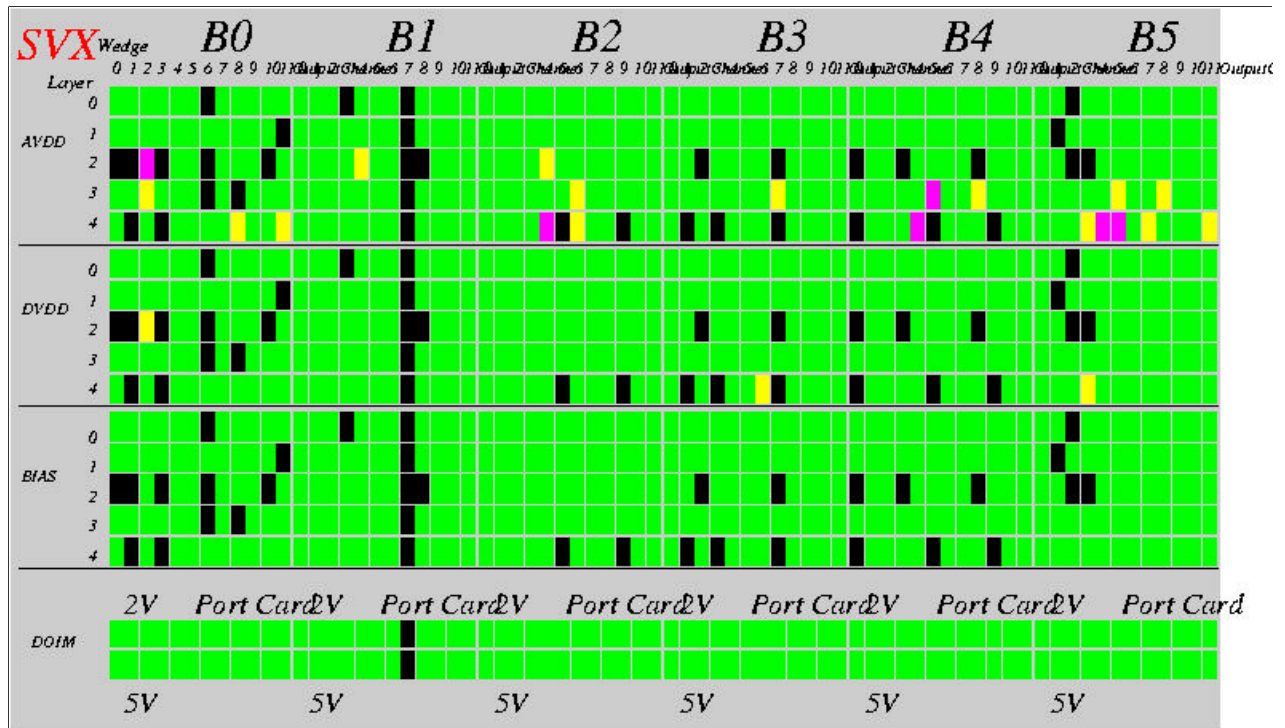
Wedge by wedge status:

yellow = STBY green = ON
red = OFF s/b ON black = OFF s/b OFF

Also, can select particular
Wedge by clicking on appropriate
"pie piece"; blue = selected

Quick I Mon Tutorial

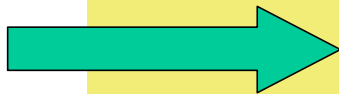
- Tracks currents for experts by color:
 - GREEN = Normal
 - YELLOW = Warning
 - PINK = Alert
 - RED = Trip
 - BLACK = Not Powered
- required by ACE (for now)



Web Documentation

www-b0.fnal.gov:8000/mcs/mondoc.html

Silicon



CDF Hardware Monitoring Documentation				
John Yoh, J. G. Yoh				
CDF iFix Slow	Controls (MCS)	ACNET -Beam	Utilities + Safety	DAQ, Misc
Tutorial- Homepage, Instructions to Shift Recovery Procedure	Web-Server Pics Access Security	Tutorial, Shot Setup, RadMon Aces' ACNET plots	Monitoring Ace Page	DAQ Ace info Operations page
Legend : READY , Preliminary , Not yet available In case of problems with systems that do not yet have recovery procedure available, Please click here for Expert call in phone lists .				
COT HV	MUONS - HV	CES-CCR-CPR	CEM,C/WHA,GAM	Trigger Inhibit
Instructions to Shift	Instructions to Shift Trip Recovery	Instruction to Shift	Tutorial, Instructions to Shift Recovery Procedure	Design Notes
SVX/JSL L00	CSX, CSP	TOF	PEM-PHA-PSH	Icicle DB
Instructions to Shift Cooling/PS Recovery Procedures Radiation Mon.		Shift Instructions	Not Available	Not Available
MNP, RPS	BSC	CLC	PTM plug temp	PSM power sup
		Instructions to Shift	Instruction, Recover	See the Alarm Help Section on the YohMan page for PSM trips.
PC BACKUP	xxx	Template	xxx	xxx
Procedure What items Other info	Not Available	Tutorial Instructions to Shift Recovery Procedure	Not Available	

31-Mar-02

Silicon Ops cdf-si-ops@fnal.gov

14

CDF RUN II COMMISSIONING

Recovery Procedures for Silicon Cooling/Power

Note: in what follows, "Alarm List" refers to the iFix page that pops up when the "D" button on the Global Alarms page is clicked. Clicking the box that says "SVX," "ISL," or "LO0" pops up something called an iFix Alarm Summary Object, which is a lot like an alarm list, except that it sucks.

1. POWER SUPPLY TRIP

Symptom: A box goes red and tweets. IN ADDITION, the bars and status box on the HV summary page go red.

What should you do? Check the Alarm List. From there you will be able to read what ladder has tripped (B1W2 L3, for a random example). Page 218.8227 armed with this information and the expert will help you recover. *Note: if, after recovery, the iFix alarms haven't cleared, try clicking "Reset Trips in CAEN" on the PS GUI.*

2. COOLING PROBLEMS/INTERLOCK TRIP

Symptom: These are signalled by either of the following:

1. The "SILICON Cooling" box on the iFix "Process Systems ALARMS" page goes red and LOUD sirens blare (can only be silenced by the cryo techs)
2. The silicon sono-alarms (located on the patch panel in rack 2RR04B) emit a loud, sustained, annoying beep (can be silenced by flipping the switch beneath them)

What should you do? The VERY FIRST THING YOU SHOULD DO is check the silicon PS GUI. If it is stuck (i.e. not counting down, see below), or if it is spewing out LOTS of messages like "ALERT" or "ILLEGAL," then hit the **Silicon Rack Power Crash Button** located underneath the sono-alarms.

In any event, page 218.8227 and the [on-call cooling/interlock expert](#) at 218.8626. They will help you recover. At the end of it all, make sure the sono-alarm switches are returned to "NOT SILENCED" and the cryo techs have unsilenced the Process Systems alarms.

Note: A non-severe cooling problem can be signalled by a red (or yellow) tweety iFix alarm that is not accompanied by a sono-alarm or a Process Systems alarm. These are rare enough that we would like you to page the [on-call cooling/interlock expert](#) at 218.8626 so we can understand the problem.

3. LOSS OF HV MONITORING

Symptom: ALL THREE silicon boxes (SVX/ISL/LO0) go red and tweet at the same time. The Alarm List shows "GUI/iFix communication NOT OK." After some amount of time (could be seconds, could be minutes), the three silicon heartbeat boxes on the HV summary page go purple.

What should you do? Check the silicon PS GUI and see if it is updating (look in the upper left corner of the window where it says "next update." It should count down from 7, stop for a few seconds at 1, then start counting down again). If it seems to be stuck,

1. Wait a little longer, like 30 seconds. If you have just recently turned a bunch of power supplies on or off, wait even longer, like 5 minutes.
2. If it's still stuck, restart the GUI by following [these instructions](#) (also posted on the GUI PC -- and they ought to be identical!)
3. If the GUI does not restart gracefully, page the GUI expert at 266.0555.
4. If the GUI restarted OK, the alarms should disappear. If they remain, or if the GUI never seemed to be stuck in the first place, page the [on-call cooling/interlock expert](#) at 218.8626. S/he will either take care of it or tell you how to take care of it.

4. LOSS OF ALARM MONITORING

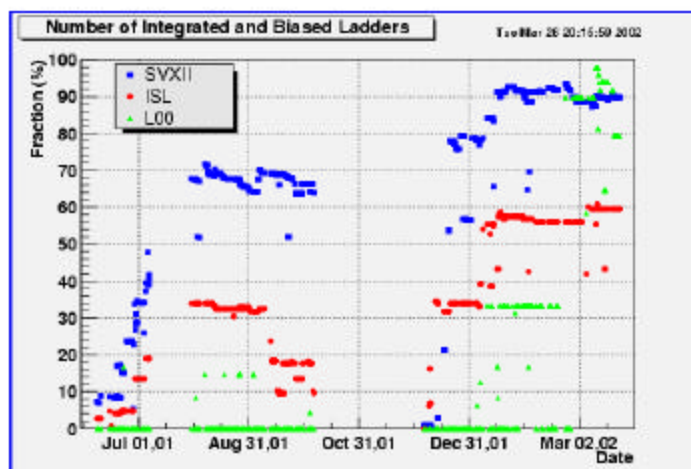
rent: Done (0.391 secs)

CDF RUN II COMMISSIONING

Silicon Commissioning and Operations

Organizational authority for the silicon projects passed from the construction projects to operations when the Run2 silicon detector was installed inside the COT. The commissioning and operation of the silicon system in run 2 are organized as part of the operations group headed by Mike Lindgren and Jeff Spalding.

The current SPLs (sub-project leaders) for silicon are [Gino Bolla](#), and [Chris Hill](#).



As can be seen from the plot of integrated ladders above, much progress has been made in commissioning the silicon. The commissioning, however, is not yet complete. A lot of work remains to be done to address the following problems with the silicon:

- SVXII has many holes in its coverage.
- SVXII is not yet stable in its operation.
- ISL central cooling blockage needs to be removed and its ladders commissioned.
- L00 needs to be commissioned.

Working groups (headed by WGLs) have been formed to focus work on specific silicon issues:

- [Detector Working Group](#) (WGL is Lester Miller)
- [DAQ Working Group](#) (WGL is Steve Nahn)
- [PS/Interlock Working Group](#) (WGL is Andy Hocker)
- [Calibrations Working Group](#) (WGL is Jason Nielsen)
- [Monitoring Working Group](#) (WGL is Savino D'Auria)

C:\Documents and Settings\chill\Application Data\Mozilla\Profiles\default\20c1w7h.stl\NewCache\BAA92BC4d01

Who to Call?

CDF RUN II COMMISSIONING

Silicon Pager Numbers

System	Pager Number
Main Silicon	218-8227
Silicon (Gino Bolla)	218-9520
Silicon (Chris Hill)	218-8940
Cooling/Interlocks	218-8626
Rad-Co	266-2713
DAQ (Lester Miller)	218-9611
DAQ (Steve Nahn)	722-7483
L00 (Dave Stuart)	722-7565
PS GUI	266-0555
Power Supplies	314-0128

CDF Monitoring Ace Silicon Instructions

As a monitoring ace, your silicon responsibilities are to:

1.MONITOR BEAM stability. Take action as prescribed by Silicon Loss Policy stated below:

- IF either LOSTP or LOSTPB exceeds 30 kHz
OR either has spikes which exceed 40 kHz
OR there is other indication of unstable beam conditions:
 - Page 218-8227 (main silicon pager)
 - Ask SciCo to notify MCR

2.CONTACT SILICON expert after scraping is complete to raise HV.

- Page 218-8227 (main silicon pager)
- Put ACNET beam losses plot in e-log
- Be prepared to run the cratematch perl script.
 - Open a terminal window on b0dap42 and type the following:
 - 1.cd ~svxii
 - 2../cratematch.pl
 - If all is well, result should be "* * * Silicon is Ready to Cold Start! * * *"

3.REACT to loud noises and/or non-green color from IFix.

- Be familiar with and follow the following specific recovery procedures:
 - [Power supply alarm/trip](#)
 - [Cooling problems/interlock trip](#)
 - [Loss of HV monitoring](#)
 - [Loss of alarm monitoring](#)
 - ["Alarm: Heartbeat"](#)
 - [Trigger inhibit](#)
- KNOW what to do in the event of a radiation abort.**

Recovery Procedures for Silicon Cooling/Power I

1.POWER SUPPLY TRIP

2.*Symptom:* A box goes red and tweets. IN ADDITION, the bars and status box on the HV summary page go red.

3.*What should you do?* Check the Alarm List. From there you will be able to read what ladder has tripped (B1W2 L3, for a random example). Page 218.8227 armed with this information and the expert will help you recover. *Note: if, after recovery, the iFix alarms haven't cleared, try clicking "Reset Trips in CAEN" on the PS GUI.*

4.COOLING PROBLEMS/INTERLOCK TRIP

5.*Symptom:* These are signalled by either of the following:

- 1.The "SILICON Cooling" box on the iFix "Process Systems ALARMS" page goes red and LOUD sirens blare (can only be silenced by the cryo techs)
- 2.The silicon sono-alarms (located on the patch panel in rack 2RR04B) emit a loud, sustained, annoying beep (can be silenced by flipping the switch beneath them)

6.*What should you do?* The VERY FIRST THING YOU SHOULD DO is check the silicon PS GUI. If it is stuck (i.e. not counting down, see below), or if it is spewing out LOTS of messages like "ALERT" or "ILLEGAL," then **hit the Silicon Rack Power Crash Button** located underneath the sono-alarms.

7.In any event, page 218.8227 and the [on-call cooling/interlock expert](#) at 218.8626. They will help you recover. At the end of it all, make sure the sono-alarm switches are returned to "NOT SILENCED" and the cryo techs have unsilenced the Process Systems alarms.

8.*Note:* A non-severe cooling problem can be signalled by a red (or yellow) tweety iFix alarm that is not accompanied by a sono-alarm or a Process Systems alarm. These are rare enough that we would like you to page the [on-call cooling/interlock expert](#) at 218.8626 so we can understand the problem.

Recovery Procedures for Silicon Cooling/Power II

LOSS OF HV MONITORING

1. *Symptom:* ALL THREE silicon boxes (SVX/ISL/L00) go red and tweet at the same time. The Alarm List shows "GUI/iFix communication: NOT OK." After some amount of time (could be seconds, could be minutes), the three silicon heartbeat boxes on the HV summary page go purple.
2. *What should you do?* Check the silicon PS GUI and see if it is updating (look in the upper left corner of the window where it says "next update." It should count down from 7, stop for a few seconds at 1, then start counting down again). If it seems to be stuck,
 1. Wait a little longer, like 30 seconds. If you have just recently turned a bunch of power supplies on or off, wait even longer, like 5 minutes.
 2. If it's still stuck, restart the GUI by following [these instructions](#) (also posted on the GUI PC -- and they ought to be identical!)
 3. If the GUI does not restart gracefully, page the GUI expert at 266.0555.
 4. If the GUI restarted OK, the alarms should disappear. If they remain, or if the GUI never seemed to be stuck in the first place, page the [on-call cooling/interlock expert](#) at 218.8626. S/he will either take care of it or tell you how to take care of it.

3. LOSS OF ALARM MONITORING

4. *Symptom:* Little "H" box for SVX/ISL/L00 on Global Alarms page goes purple and stays that way for > 5 min. May also be accompanied by a voice alarm, I don't know.
5. *What should you do?* Page the [on-call cooling/interlock expert](#) at 218.8626. S/he will either take care of it or tell you how to take care of it.
6. **"ALARM: HEARTBEAT"**
7. *Symptom:* Some or all of the silicon heartbeat boxes go purple, but everything else seems OK.
8. *What should you do?* If it clears within, say, five minutes, don't worry about it. If it doesn't clear itself, page the [on-call cooling/interlock expert](#) at 218.8626. S/he will either take care of it or tell you how to take care of it.

9. TRIGGER INHIBIT

10. *Symptom:* The DAQ ace wanders over to your side of the room complaining about a SVX/ISL/L00 trigger inhibit. Since the most likely cause of inhibits are trips, this will probably be redundant with all the symptoms of a power supply trip; see above. However, there may be cases where the inhibit is the result of something more mysterious.
11. *What should you do?* Page 218.8227. *Handy tip: if you check the iFix Trigger Inhibit Status page, you can determine which ladder is causing the inhibit and impress the silicon expert with your wicked-awesome Monitoring Ace skills.*

Conclusion

Your main responsibility to silicon is to help keep it **safe**.

When in doubt, page 218.8227...
if no response, turn it to STANDBY
(or OFF if cooling problem).

Consumer Monitors

Kaori Maeshima
Fermilab

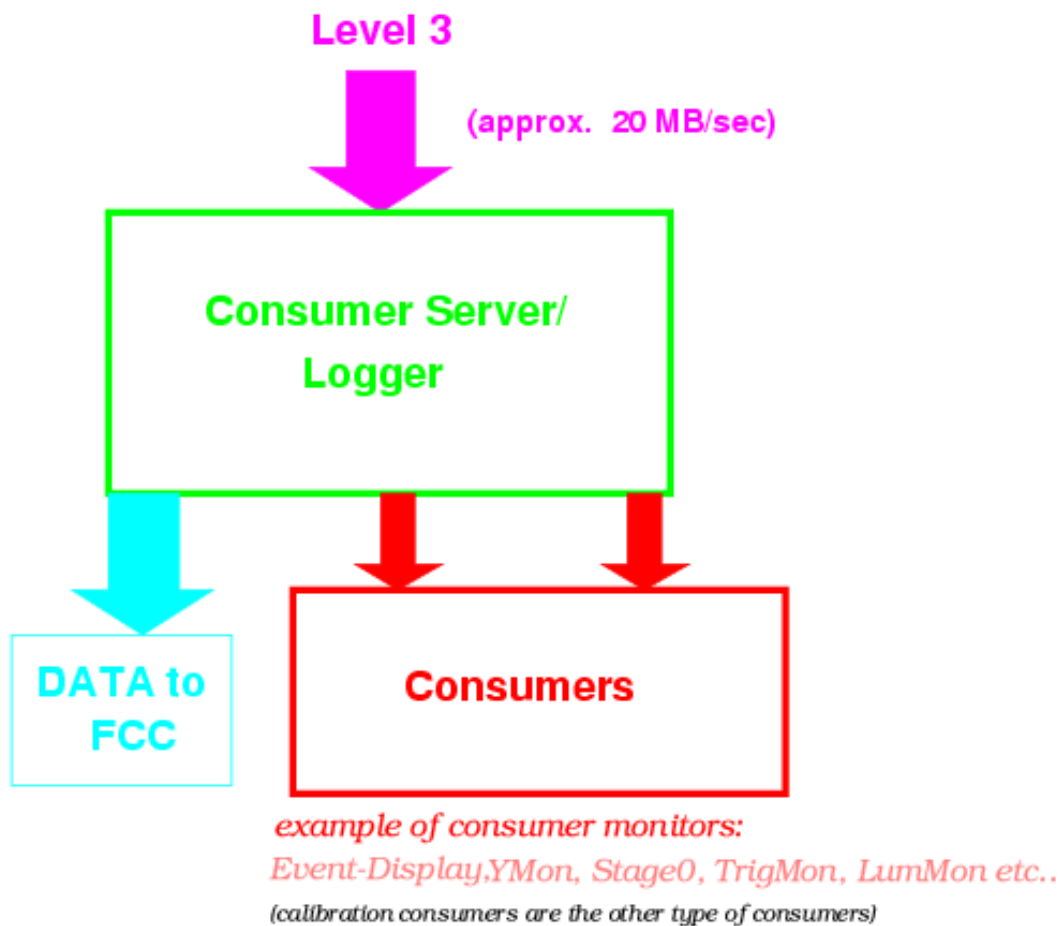
ACE Training
March 27th, 2002

- **Consumer Framework Overview**
- **Consumer Operation at Control Room**

CDF RUN II Consumer Home Page

[http://www-b0.fnal.gov:8000](http://www-b0.fnal.gov:8000/consumer/home/consumer_home.html)
[/consumer/home/consumer_home.html](http://www-b0.fnal.gov:8000/consumer/home/consumer_home.html)

How consumers get data?



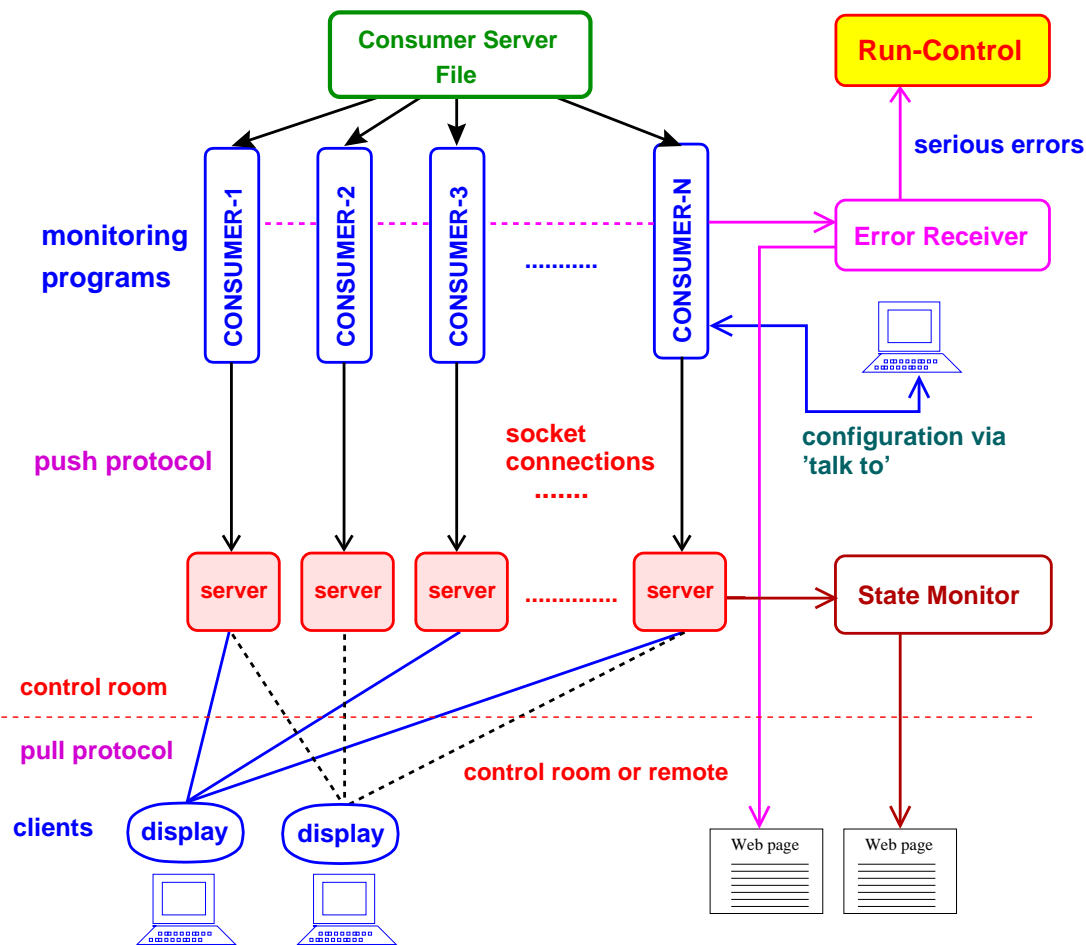
1. Level 3

- Final level of event filtering.

2. Consumer Server / Logger (CSL)

- Writes events passing Level 3 to disk.
- Serves events to consumers.

Consumer Framework Components



1. Consumer

- Analyse and monitor the event data from CSL.
- Send error messages to the error receiver.

2. Server

- Receives ROOT objects from consumer via socket.
- Reports the status of consumers to the state manager.

3. Display (HistoDisplay)

- Receives ROOT objects from server via socket.
- Updates objects (histograms, tables, etc.) on canvas.

CO Help Page

<http://www-b0.fnal.gov:8000/cohelp/cohelp.html>



Netscape: Consumer Operator Home Page

File Edit View Go Communicator Help

Back Forward Reload Home Search Netscape Print Security Shop Stop








Bookmarks Location: <http://131.225.236.1:8000/cohelp/cohelp.html> What's Related

E-Log Runs last 8 hrs CDF E-Logs Consumer Status CDF Ops cdf online cdfhome ACE Info Phone List

 **CO Information for Run II** 













Things every CO should know; the [old CO help page](#) still contains some information not included here. Additional information may be found on the [ACE help Page](#).

What CO's should do

	Running/restarting the consumers.		Compare slide show and other histograms to reference histograms
	Restart the consumer displays		Calibrations and viewing their results with DBANA .
	CDF electronics logbooks (e-logs)		Use the Event Display
	Use the CDF consumer displays to monitor incoming data or to look at past runs		

Consumer Monitors ([Home Page](#), [Status Page](#), [List of Monitors](#))

[General considerations for viewing monitoring plots](#)

	YMon		ObjectMon
	TrigMon		BeamMon
	XMon		SiliMon
	LumiMon		Stage0 (COT)
	EventDisplay		SPYMon
	SVXMon		L3RegionalMon

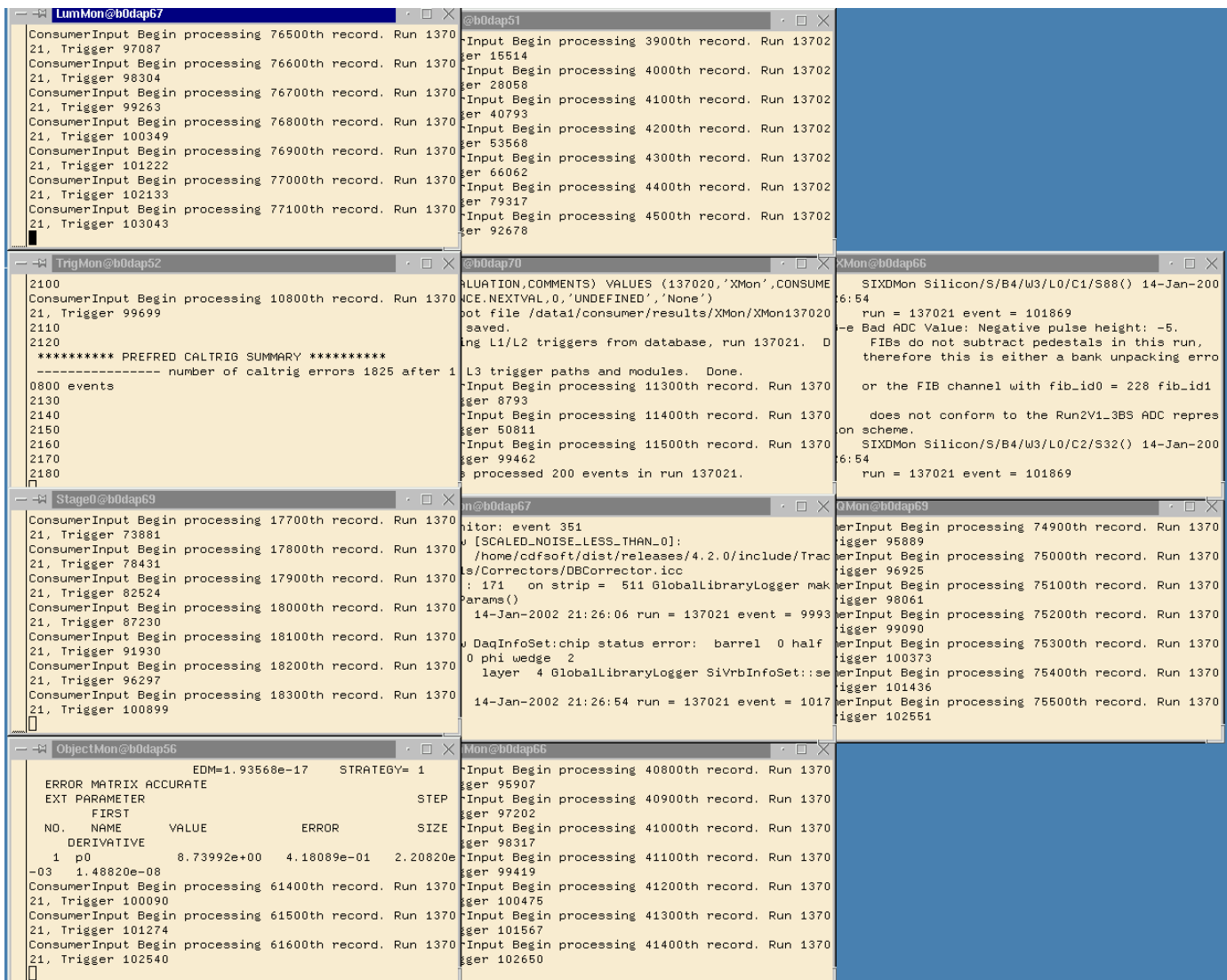
[FAQs](#)

Last update: 18-Oct-2001 RJT
To update this page, follow these [instructions](#).
[Security, Privacy, and Legal](#)

100%

How to start consumer monitors

1. Go to /cdf/people1/cdfdaq/consumer_scripts directory on b0dap51
(Type : **cd consumer_scripts**)
2. Type : **./startMon.sh All < PartitionID >**
3. Server for each consumer start automatically.



The screenshot displays a grid of terminal windows, each representing a different consumer monitor running on a specific b0dap node. The windows are titled with the monitor name and the node ID, such as 'LumMon@b0dap67', 'TrigMon@b0dap52', 'Stage0@b0dap69', 'ObjectMon@b0dap56', 'XMon@b0dap51', 'XMon@b0dap70', 'XMon@b0dap66', 'QMon@b0dap69', and 'Mon@b0dap66'. The output in each window shows the monitor's progress, including the record number being processed (e.g., 'ConsumerInput Begin processing 76500th record'), the trigger value (e.g., 'Trigger 97087'), and the run number (e.g., 'Run 13702'). Some windows also display detailed error messages or status reports, such as '***** PREFRED CALTRIG SUMMARY *****' in the TrigMon window and '***** ERROR MATRIX ACCURATE *****' in the ObjectMon window. The ObjectMon window includes a table with columns for 'NO.', 'NAME', 'VALUE', 'ERROR', and 'SIZE', showing data for various parameters like 'p0' and 'p1'. The overall layout suggests a distributed system where multiple monitors are running simultaneously on different nodes to process data from a single run.

Consumer Status Page

1. Before attach a consumer to HistoDisplay, make sure that the consumer appears on the consumer status page (minimum 10 events).
http://www-b0.fnal.gov:8000/consumer/consumer_status.html

List of Servers

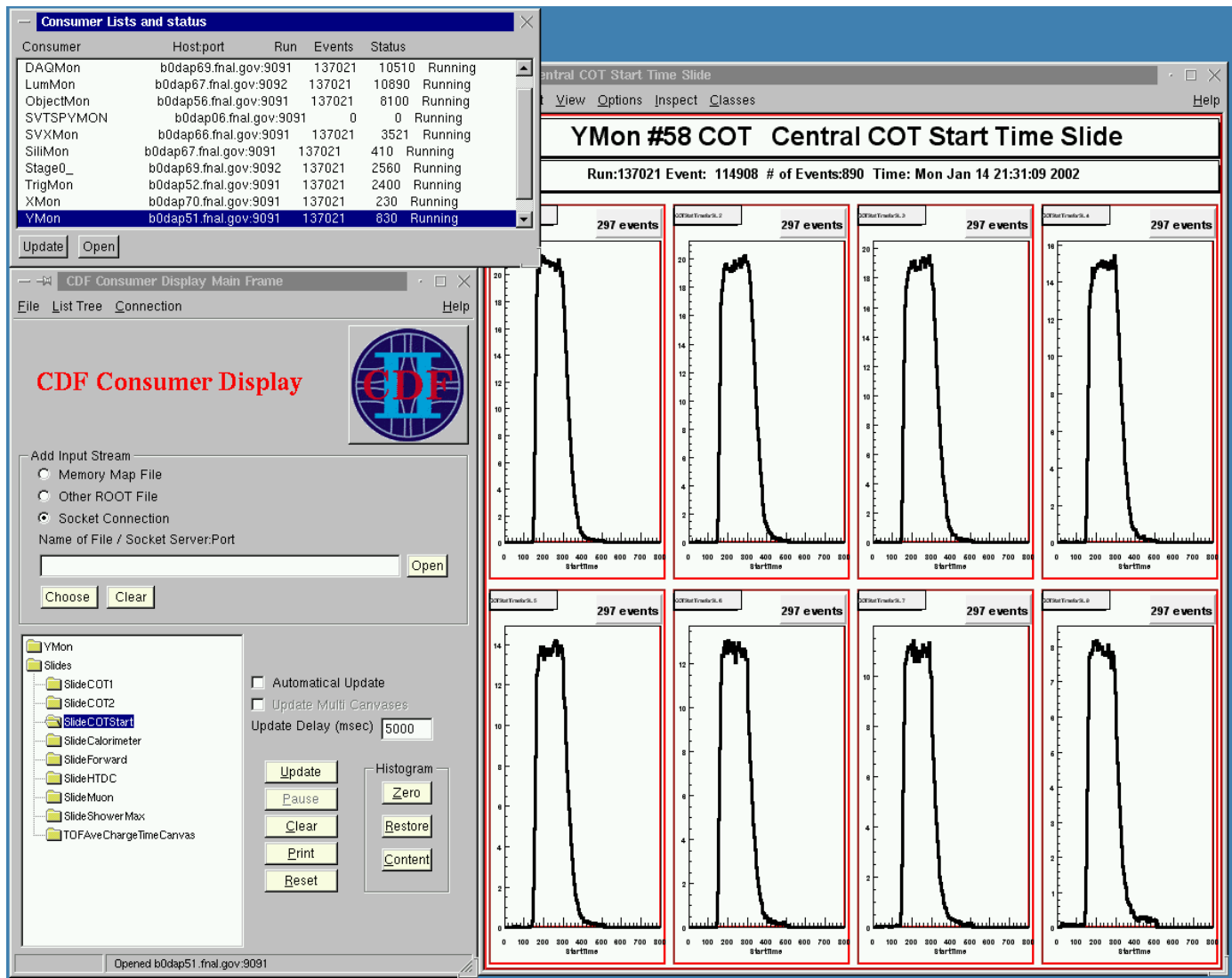
Status of Consumerserver Processes:

Consumer	Hostname	Port	Run number	# of Events processed	Server Status	Time
BeamMon	b0dap66.fnal.gov	9092	137021	9560	Running	Mon Jan 14 21:25:25 2002
DAQMon	b0dap69.fnal.gov	9091	137021	9570	Running	Mon Jan 14 21:24:56 2002
LumMon	b0dap67.fnal.gov	9092	137021	9750	Running	Mon Jan 14 21:25:03 2002
ObjectMon	b0dap56.fnal.gov	9091	137021	7330	Running	Mon Jan 14 21:24:54 2002
SVTSPYMON	b0dap06.fnal.gov	9091	0	0	Running	Mon Jan 14 21:25:30 2002
SVXMon	b0dap66.fnal.gov	9091	137021	3473	Running	Mon Jan 14 21:25:51 2002
SiliMon	b0dap67.fnal.gov	9091	137021	330	Running	Mon Jan 14 21:24:38 2002
Stage0_	b0dap69.fnal.gov	9092	137021	2300	Running	Mon Jan 14 21:25:16 2002
TrigMon	b0dap52.fnal.gov	9091	137021	2030	Running	Mon Jan 14 21:24:50 2002
XMon	b0dap70.fnal.gov	9091	137021	210	Running	Mon Jan 14 21:25:34 2002
YMon	b0dap51.fnal.gov	9091	137021	750	Running	Mon Jan 14 21:24:50 2002
spymon_test	b0dap68a.fnal.gov	9091	0	0	Running	Mon Jan 14 21:24:30 2002

Last Update: Mon Jan 14 21:25:51 2002

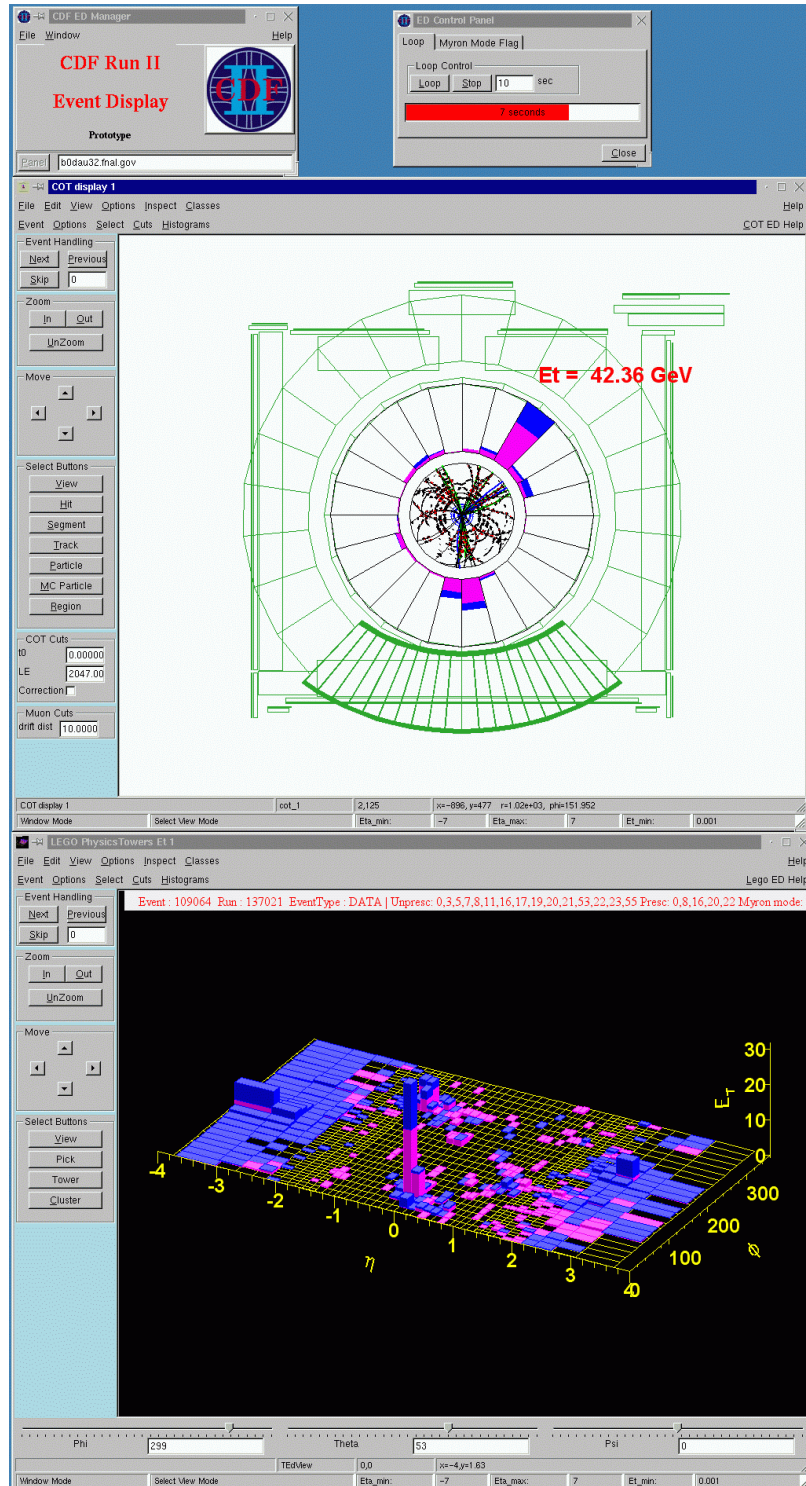
How to start HistoDisplay

1. Go to /cdf/people1/cdfdaq/consumer_scripts directory on b0dap51
2. Type : **./startDisplay.sh All**
3. HistoDisplays appear on top and bottom screens of b0dap52, 55 and 56



How to start Event Display

1. Go to `/cdf/people1/cdfdaq/consumer_scripts` directory on b0dap50 (left most terminal).
2. Type : `./startEvd.sh < PartitionID >`



Odds and Ends

- Tell the CO the partition ID on which you start taking data. In general, it is a good idea to tell CO when you are starting/stopping a run.
- Check “UseLevel3Manager” is enabled in the Run Control. If not, consumers can not start running.

File	Browse	Create	Triggers	Data Type	LookArea	Inhibits
Expert:						
<input checked="" type="checkbox"/> UseFred	<input type="checkbox"/> UseSrc	<input checked="" type="checkbox"/> UseScaler	<input type="checkbox"/> UseTM	<input checked="" type="checkbox"/> UseLevel3Manager	<input checked="" type="checkbox"/> UseErrorHandler	
<input type="checkbox"/> UseSlowControl	<input type="checkbox"/> MyronMode	<input type="checkbox"/> L1Early	<input type="checkbox"/> IgnoreError	<input checked="" type="checkbox"/> IgnoreBusy	<input type="checkbox"/> EnableFP	
<input type="checkbox"/> DisableCrates	<input type="checkbox"/> DisableL1Calib	<input type="checkbox"/> StartOnB0	<input type="checkbox"/> Svx396Mode	<input checked="" type="checkbox"/> IgnoreBC	<input type="checkbox"/> LoadQJEFRAM	
<input type="checkbox"/> LoadEtAlgo	<input type="checkbox"/> LoadEtTable	<input checked="" type="checkbox"/> LoadDacs	<input checked="" type="checkbox"/> DacFromHdb			

- Please help COs.
- Old root files (monitor output files) can be found in /data1/consumer/results/xxxxMon area and older root files can be found in /cdf/cdf-cf-data1/results/xxxxMon area. One can use the same HistoDisplay GUI as used on online to view these root files.
- When you find any problems in consumer monitors in general, please notify us, consumerframework people: (send mail to maeshima@fnal.gov, page:online monitor 266-2705, etc...).

DAQ Training for Silicon

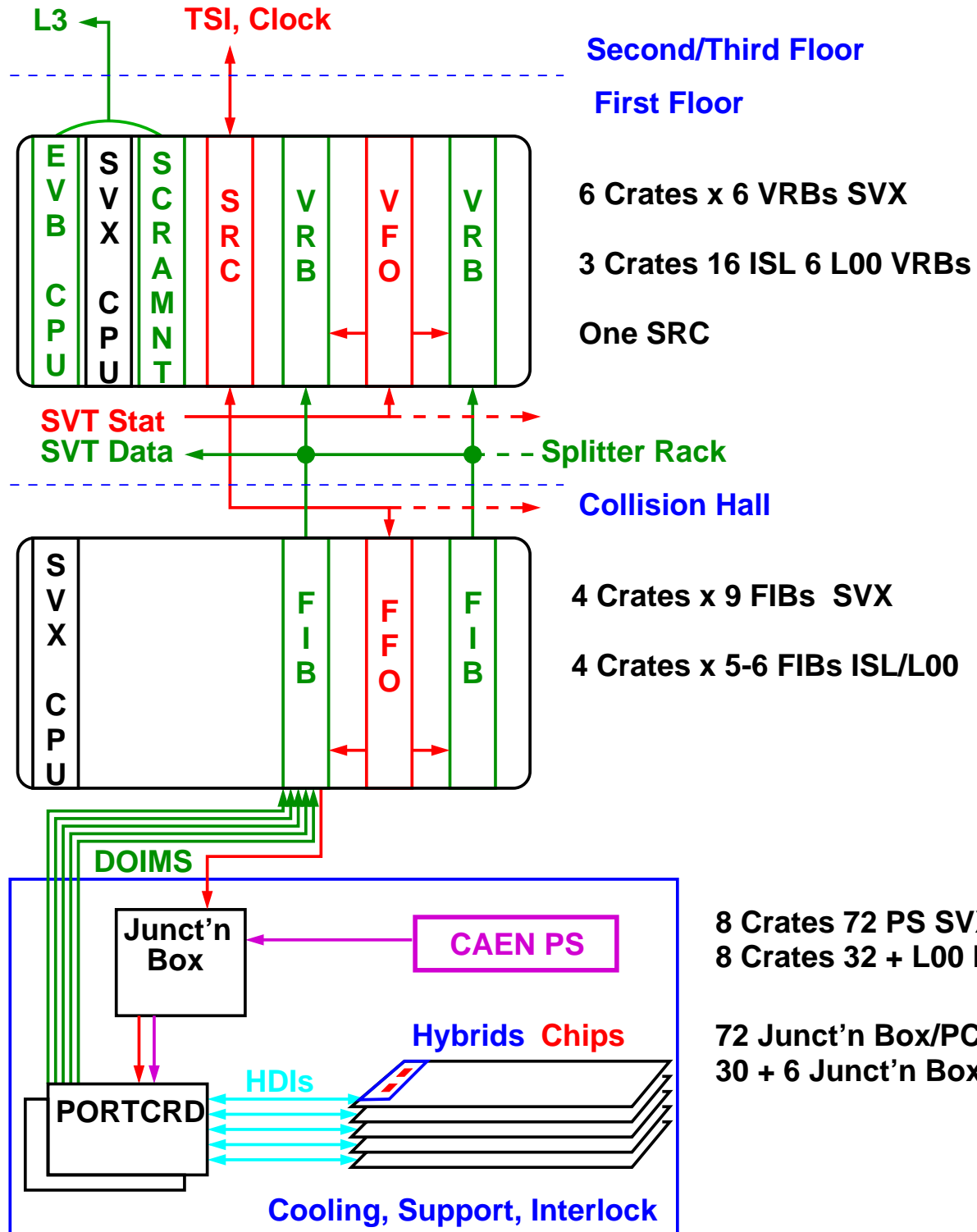
Steve Nahn
Ace/SciCo Training
Today

Purpose: To readout the 712 kChan Silicon detector.
(For this talk, there is no difference between L00, SVXII,
and ISL)
Emphasis on differences from “*Normal*” DAQ

Friendly Advice:

- Learning about how things work will save time and earn **Glory and Praise**
- Your SciCo is *NOT* an expert. Don't let them waste too much time theorizing, call a real expert.

— Control Path — Data Path — Power Path



8 Crates 72 PS SVX
8 Crates 32 + L00 PS ISL

72 Junct'n Box/PC SVX
30 + 6 Junct'n Box/PC ISL

What is Silicon DAQ: VME components

- 17 Crates: 9 Vrb crates `b0svx00-08`, 8 Fib crates `b0fib00-07` , **One (SRC)** `b0svx02` connected to TSI
- SRC fans out **all** trigger decisions, fans in **all** status conditions- TSI timeouts and errors **only** come from SRC (`b0svx02`) even though problems may be elsewhere.
- MVME controller only does initialization, monitoring, and X Mode calibration analysis - **Readout** taken care of entirely by hardware (and EVB after L2A).
- Vrbs are integral part of front end, involved in L1 processing, and are used with *BOTH* Hardware and Software EVB

What is Silicon DAQ: Non-VME components

- ~ 6000 chips spread over 557 HDIs (aka “ChipChains”), 115 PCs
 - n chips/HDI init'd by $(197 \times n \text{ bit})$ bitstream sent via Fib
 - 46 deep pipelines (42 crossings + 4 L2 buffers):
L1DONE \Rightarrow freed buffer signal SRC \rightarrow TSI
- 115 Power supplies in 16 CAEN crates controlled by one VME crate.
 - All accessed by IFIX via the PS GUI
 - “Power up” conditions (currently) =
EXPERT && COOLING && BEAM OK
Changing as we get experience

- Other
 - Cooling and Interlocks controlled by IFIX
 - Radiation Monitoring System tied in with AC-net, feeds back to MCR
 - RASNIK & Inchworm alignment systems controlled by stand alone systems, logged by IFIX

Software Tasks for Silicon

- Run Control

- Initialization: Download VME and chip parameters from HDWDB, RUNDB (`SvxSet`), pedestals and thresholds from CalibDB (`DBBroker`)

- * Chip Initialization Error

(MLE) b0fib00:Messenger:8:09:30 AM->Error
Initializing HDI Slot 15 Chan 1: SVX B1Wa
Action: Check Power, Try Again

- * VRB wacked out

(MLE) b0svx00:Messenger:6:03:23 AM->VRB
Module ID != 3 Slot 18
Action: Reset that VRB (Do not power cycle
crate, clean up EVB, etc).

- Monitoring

- * VME parameters and Occupancy published at 0.01 Hz. GUI soon ready for prime time.

- * No CPU \Rightarrow No Event Counting \Rightarrow End of Run Summary show:

```
(EOR) b0fib00:   triggered 0/readout 0/sent  
0 events
```

- * Board error/status bits published on HALT for error diagnostics

```
(MLE) b0svx07:Messenger:7:34:19 AM->Silicon  
Timeout:!DONE- Slots:   16:f420
```

```
(MLE) b0svx01:Messenger:5:32:23 PM->Silicon  
Timeout:BUSY- Slots:   20:e1a0 18:e180
```

- Calibration: Several Run Types (Pedestals, Threshold and Gain Scans) being developed in both X and D Mode to calibrate the detector in the RC framework.

- SVXMon, SiliMon consumers (LBL, Liverpool)- Exhaustive online consumers makes Pulseheight spectra, Occupancy histos, monitors for data format errors, etc.
- PS GUI for PS control (\Rightarrow IFIX)
- CDFVME software for Expert Diagnostics

Errors and what they mean

- General
 - TSI Timeouts (BUSY or DONE TO) *a/ways* from SRC (b0svx02) though problem may be elsewhere.
 - HALT \Rightarrow all boards queried and status published (VME GUI, Error Handler)
 - 1st line of defense \Rightarrow HALT-RECOVER-RUN
 - The **ONLY** time to reboot a fib or vrb crate is when it does not respond to a RC transition
N.B. Failed Chip Initializations can take a long time
- DONE TO- Data did not flow from chip through Fib to Vrb after L1A- almost never happens, usually because a PS tripped

- **BUSY TO-** The EVB has stopped reading Vrb's (problem in SCPU's, the ATM, or Level 3). When EVB stops, Silicon VRB's become **BUSY** before the DAQ Vrb's
- **ERROR TO-** Some VME board told SRC to pull CDFERROR
 - Operational problem (Fifo overflow ...)
 - Data format error (Events unsynchronized ...)
- **Reformatter Errors-** Data corruption/Bad ladder ⇒ reformatter cannot decode detector ID. If persistent, either the PS tripped or a ladder has gone south. Call expert.
- **Erratic "Silicon Related" Errors**
Check configuration (ex: ACE_SVX_ONLY):

1. SvrxSet \neq **None**

2. UseSrc selected

3. IgnoreBusy deselected

4. All 9 Silicon Vrb crates included

All Vrb crates must be included, though you may drop troublesome Fib crates.

- Power Supply and Cooling trips - Call Expert
- Consumer Reported Errors- UnSynch'd pipelines
⇒ HRR

Experts tend to keep an eye on the Shift e-log, and there is a special Silicon e-log as well, where solutions and operations are discussed in more detail

Who and Where to get help from

- Generic

Si Ops Pager	218 8227
Problem report	cdf-silicon-op@fnal.gov

- Silicon Experts

Si Ops	G. Bolla, C. Hill
Si SubOps	S Nahn, L Miller, A Hocker, J Nielsen
DAQ	S Nahn
Slow Controls	A Ivanov, A Hocker, M Coca, Eva
Consumers	H. Bachacou, T. Shears
Other	Cast of few

- Web

(/si=http://www-cdf.fnal.gov/internal/silicon/silicon_commission)

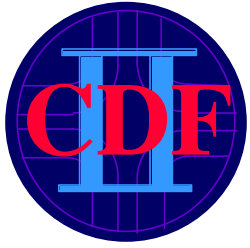
(/b0=<http://www-cdfonline.fnal.gov/>)

Official </si/daq.html>

Needs updating </b0/ace2help/svx/svxInfo.html>

Needs updating /b0/~svxii/runii/cdfaces/ace_daq.htm

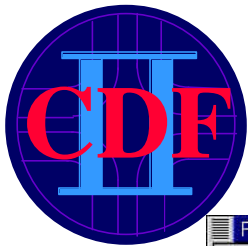
Do **NOT** hesitate to contact an expert. When in doubt, call the Si Ops Pager.



Run Control

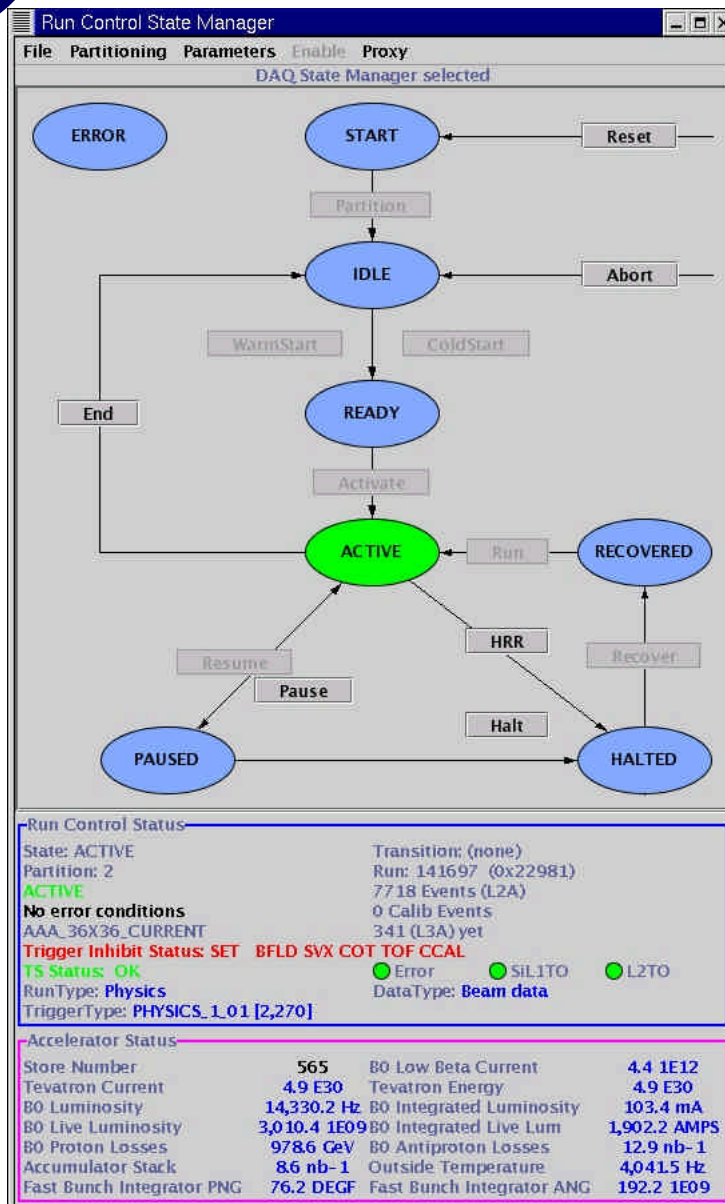
W. Badgett
Run Control &
Run Configuration
27-Mar-2002

How to start, configure
and operate CDF
Run Control



Run Control, main window

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Run Configuration
27-Mar-2002

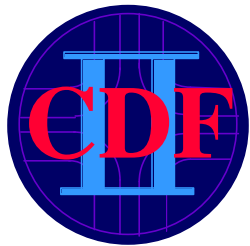


Main Run Control Window:
Includes RC State Manager,
Configuration pull-down
menus, Run Control Status,
and Accelerator Status panels

Start Run Control:
setup for
rc
(ace uses *cdfdaq* account)
Just 3 steps to run!

1. Select State Manager
2. Select Partition
3. Select Configuration

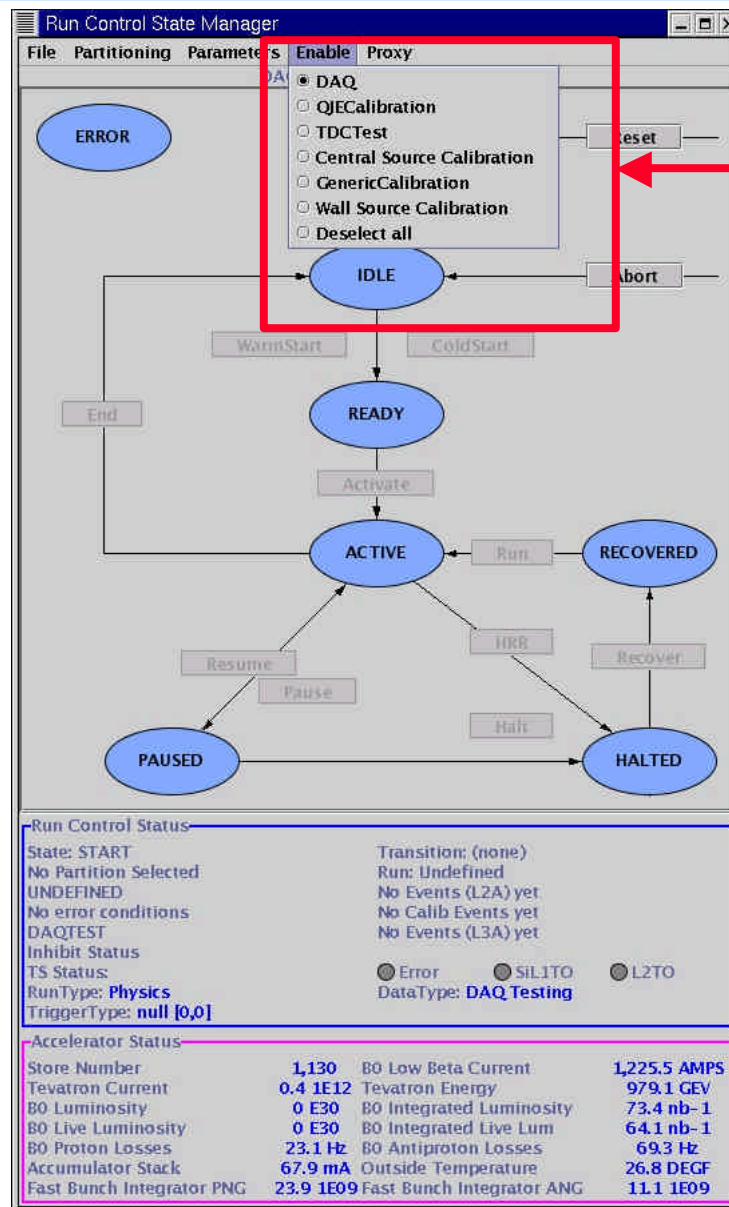
Run!



State Manager Selection

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Run Control &
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27-Mar-2002

Step 1

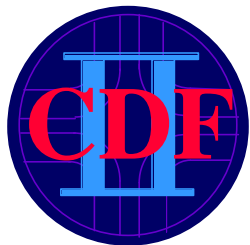


Select State Manager:

- Usually **DAQ**
- GenericCalibration for calibrations unless specific menu item for given run type: e.g., QIE Calibration

Source, TDC testing are primarily for experts

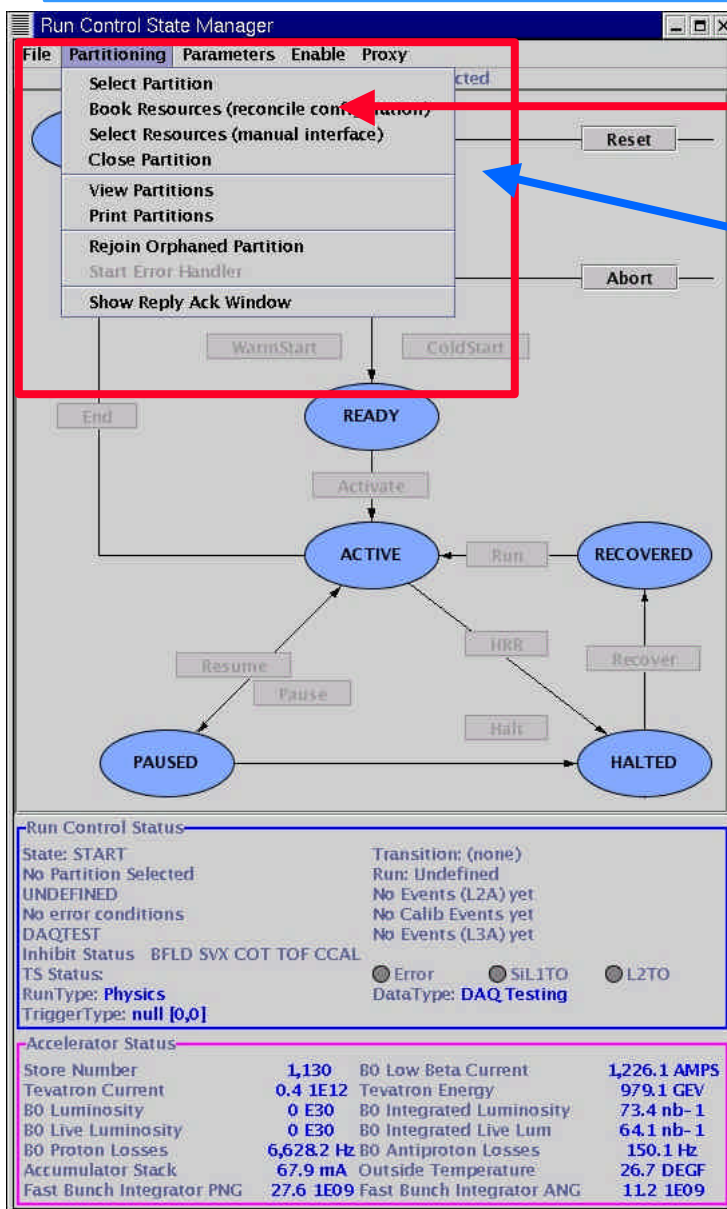
The State Manager determines the flow of control when cycling through runs



Step 2

Select Partition

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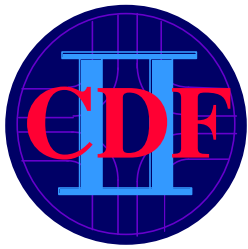
Select partition

Select or view
resources
manually

Each Run Control Session
must be allocate a *Partition*

Each front end crate belongs
to no more than one *Partition*

Partitions prevent collisions
between sessions



Partition Selector

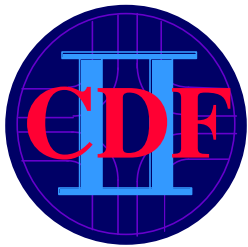
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Step 2a



Select Partition:

- Cyan is free
 - Yellow is owned by another
 - Green is yours
 - Mouse over to display owner and hardware/software status
-
- 0–7 are hardware partitions
 - 8–15 are software partitions



Resource Selector

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CDF Resource Selector Partition 0

File Resources Partition

Crate: WCAL_02
Crate: WCAL_03
Crate: WCAL_04
Crate: WCAL_05
Crate: WCAL_06
Crate: WCAL_07
Crate: IMU_00
Crate: IMU_01

Active partitions:

Partition	Owner	Resource	Address	Contact
0	badgett	b0dap13.fnal.gov	14246	badgett
6	jsm	b0dap19.fnal.gov	14734	jsm
14	csl	b0dap60.fnal.gov	5683	cdf_csl@fnal.gov

Failed to book resource L2GL

ResMgr>

CCAL	PCAL	WCAL	COT	CMU
CMP	CMX	IMU	MUSC	HTDC
CLC	SVX	XFT	SVT	MUTR
L1CL	L1CL	L2CL	L2GL	VRB
L1	L2	L3	SEVB	SCALERS
CES	PSRC	TDC	COTPULS	COTTEST
FCAL	CALPULS			

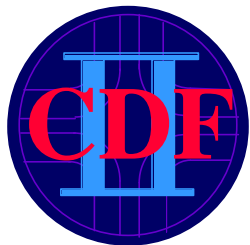
Select Resources:

- Cyan is entirely free
- Red is entirely owned by another partition
- Blue is partially owned by another partition
- Yellow is partially yours
- Green is entirely yours
- Mouse over to display owner

Click to book/unbook

Right-click for more info

Step 2b
Optional

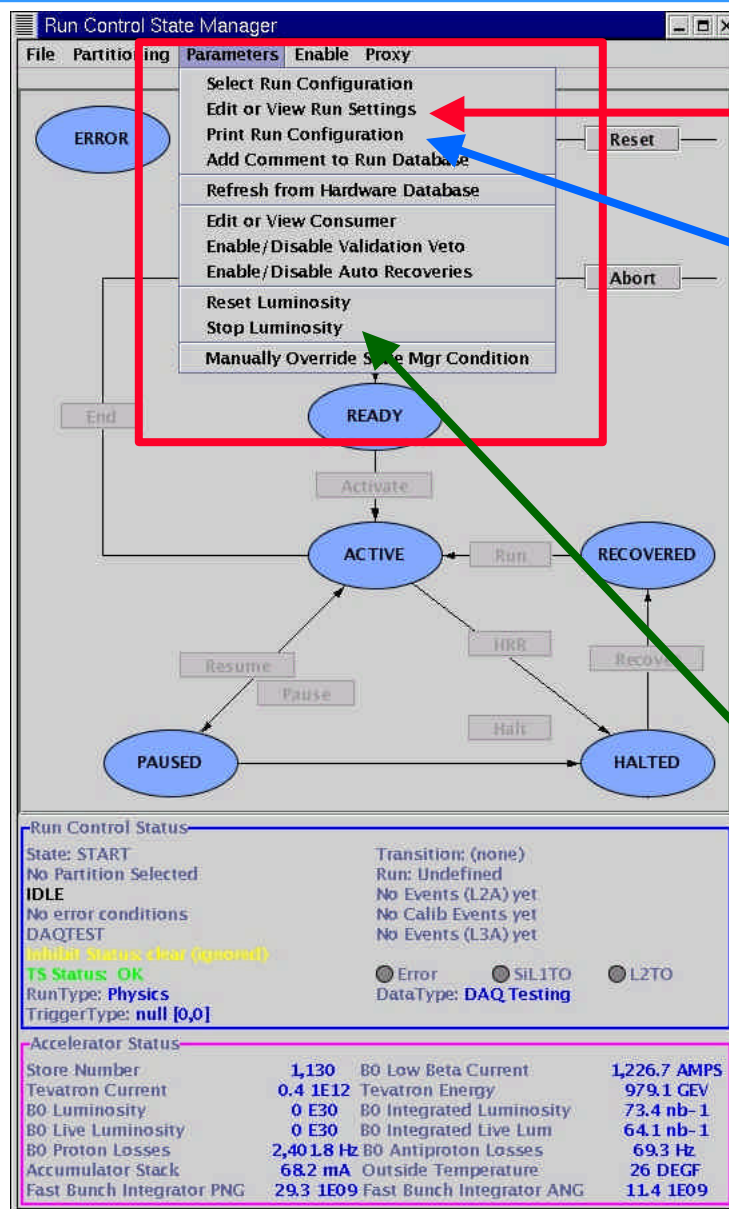


Selecting Run Configuration

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Step 3

After selecting a configuration, you're ready to start a run!



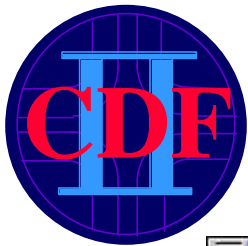
Select predefined run configuration

Edit or view run configuration



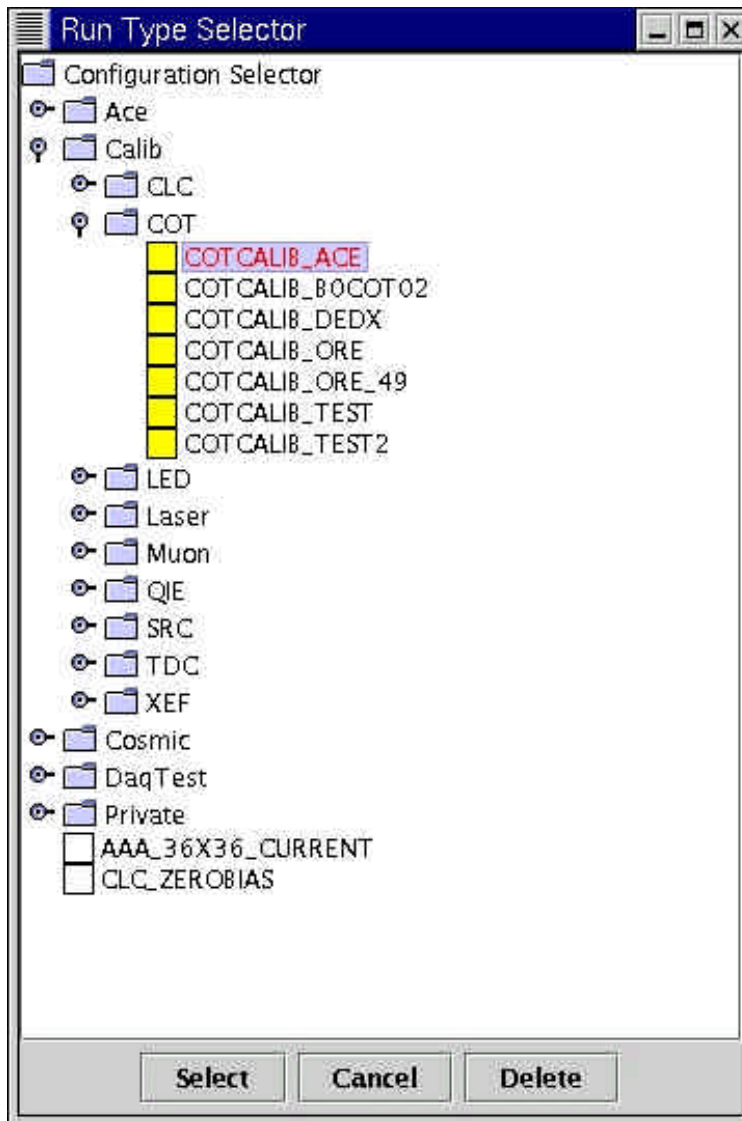
Frank sez:
"This is the ace's most important duty!"

Reset or stop luminosity counters at beginning and end of shot



Run Configuration Selector

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Run Configuration
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Select from predefined run configurations

- Ace directory contains all physics and test runs for the Ace, and is maintained by Ops Managers
- Cosmic directory for Cosmic Ray runs
- Calib directory contains calibration configurations, and is maintained by component experts in subdirectories
- Other directories for private testing purposes

Or create your own configuration!



Run Settings Window, standard

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Run Control &
Run Configuration
27-Mar-2002

Parameter	Value
Directory	16777215
Status	0
NEvents	0
RunSectionInterval	50
Iteration	0
TsCode	0
CalibPipe	0
CalibInterval	3
Interval 0	30

Chosen	All Choices
	BEAMMON
	CLCCALIB
	CLCCALIB_ROOT
	L3REGIONALMON
	LUMMON
	OBJECTMON
	SIUMON
	STAGE0
	SVXMON
	TESTMON

Chosen	All Choices
	CAL_PULSER_01
	CES_TEST_00
	COT_TEST_20
	LEVEL2_DECISION_01
	PCAL_SOURCE_00
	SVT_MONITOR_00
	TDC_TEST_00

Aces should know all options on this window

Global DAQ RunType

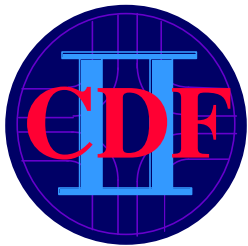
Trigger Table, coupled

CalorCalibSet, when Plug source, LED, Xenon run types

SVX Set, when SVX is used Usually FIBTEST

Consumer Selection (calibration run types only for now)

Front end crate selection Move to left to include



Run Settings, Expert Options

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Run Control &
Run Configuration
27-Mar-2002

Run Set: AAA_36X36_CURRENT Owner: RUN_USER

File: Browse Create Triggers Data Type: LookArea Inhibits

Expert: ☒ UseFred ☒ UseSic ☒ UseScaler ☒ UseTM ☒ UseLevel3Manager ☒ UseErrorHandler

☐ UseSlowControl ☐ MyronMode ☐ L1Early ☐ IgnoreError ☐ IgnoreBusy ☐ EnableFP

☐ DisableCrates ☐ DisableL1Calib ☐ StartOn80 ☐ Svx306Mode ☐ IgnoreRC ☐ LoadQEFram

☐ LoadFitAlgo ☐ LoadFitTable ☒ LoadData ☒ DataFromHbb

Run Type: Physics Trigger Type: PHYSICS_1_01 [2,270]

SvxSet: SVX_NO_PEDS CalibCalibSet: (none)

Output: ☐ Ethernet(SoftEvb) ☒ VME(HardEvb) ☒ RunNumber ☒ DiagnosticBank ☐ ExtraDBanks

L1 Mode: ☒ Standard (Fred) ☐ Calib Fixed Period ☐ Calib External Trig ☐ Calib SVX ☐ Calib Continuous ☐ Software

L2 Mode: ☐ Auto L2 Accept ☐ Auto L2 ALT ☐ Auto L2 Reject ☒ L2 Processors

L3 SubForms: All None

Output 0: ☒ 0 ☐ 1

Output 1: ☒ 2 ☐ 3

Output 2: ☒ 4 ☐ 5

Output 3: ☒ 6 ☐ 7

Output 4: ☒ 8 ☐ 9

Output 5: ☒ 10 ☐ 11

Output 6: ☒ 12 ☐ 13

Output 7: ☒ 14 ☐ 15

Parameter	Value
Directory	
Status	16777215
NEvents	0
RunSectionInterval	50
Iteration	0
Ts Code	0
Calib Pipe	0
Calib Interval	3
Interval 0	30

Consumers: ☐ All Choices

☐ FEAMON ☐ CLOCAL ☐ CLOCAL_ROOT ☐ L3REGIONALMON ☐ LUMMON ☐ OBJECTMON ☐ SLIMON ☐ STAGE0 ☐ SVXMON

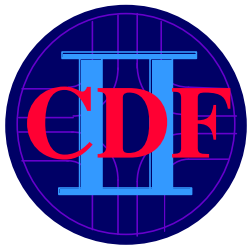
Crates: ☐ All Choices

☐ CAL_PULSER_01 ☐ CES_TEST_00 ☐ COT_TEST_20 ☐ LEVEL2_DECISION_01 ☐ PCAL_SOURCE_00 ☐ SVT_MONITOR_00 ☐ TDC_TEST_00

Expert options can be enabled from the File pull-down menu

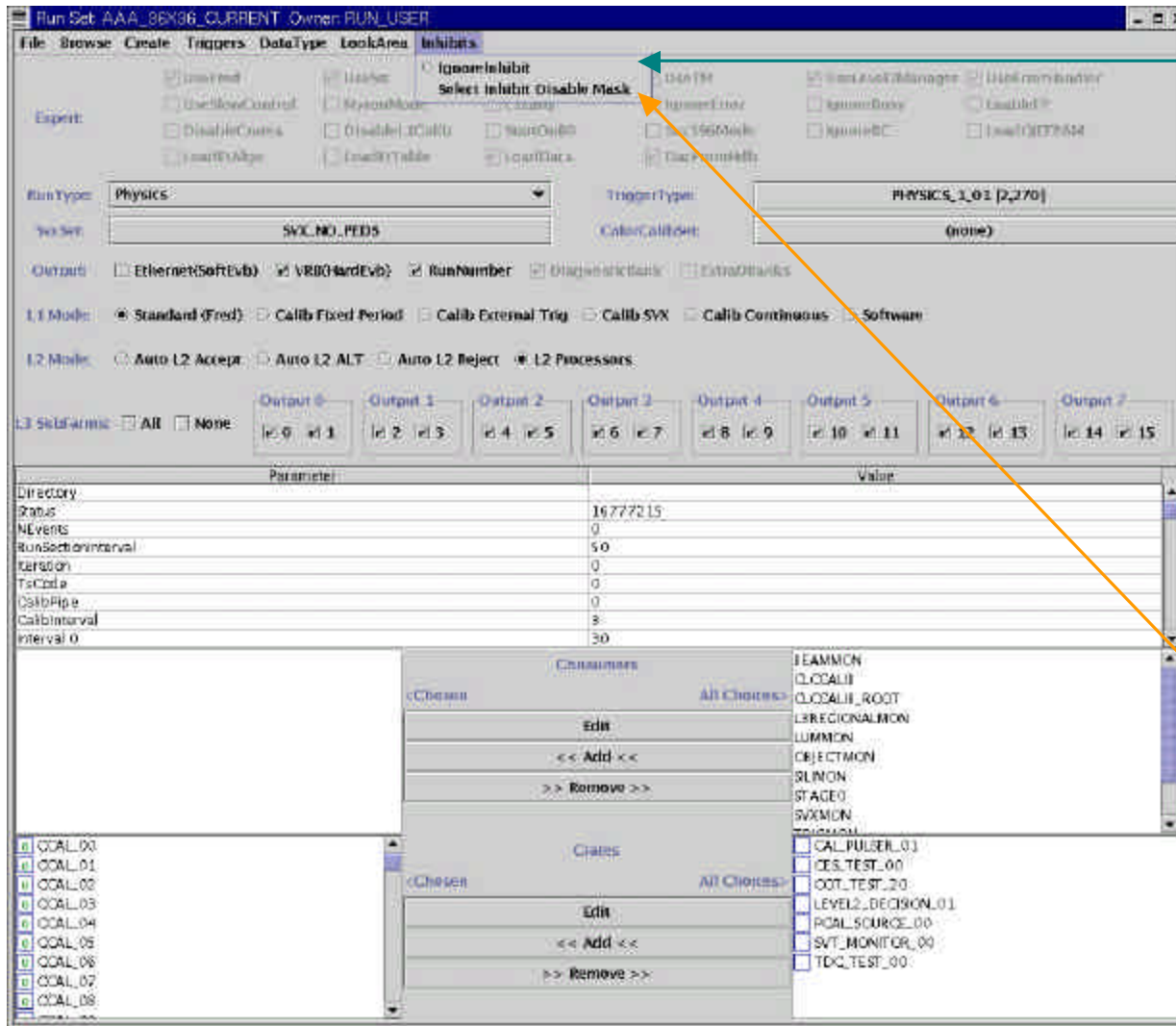
Many expert options are triggered by the selection of other options or the addition of crates

You may be asked to take special runs, e.g. MyronMode with L1Early, which are only available in the expert options



Trigger Inhibits

W. Badgett
Run Control &
Run Configuration
27-Mar-2002

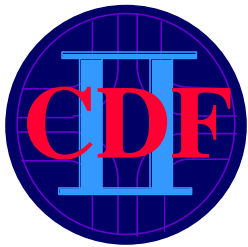


Inhibits normally used only during physics (colliding beam) runs, otherwise set Ignore Inhibit to true

Inhibit sources are tied to the crates and components you have chosen, and are selected automatically

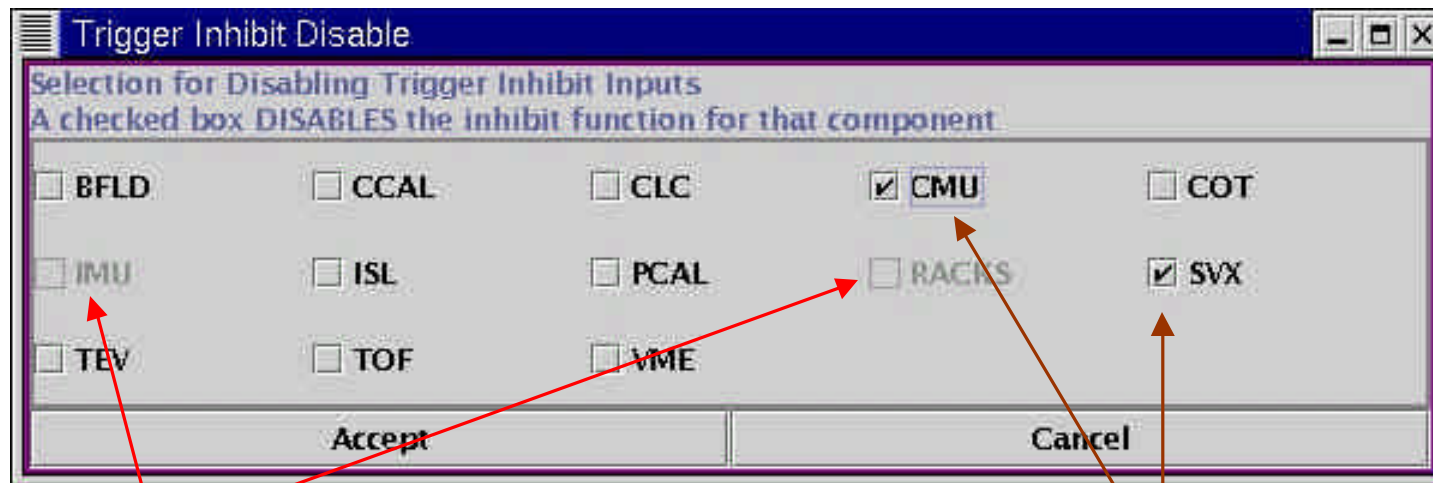
In an emergency, you may have to disable misbehaving inhibit signals

Inhibits cause data taking to stop, watch event rates and Inhibit LEDS



Trigger Inhibit Disable Masking

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Run Configuration
27-Mar-2002

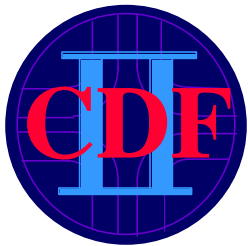


Greyed options are not yet working and do not contribute to inhibits

Select which components should be **disabled** from providing an inhibit signal

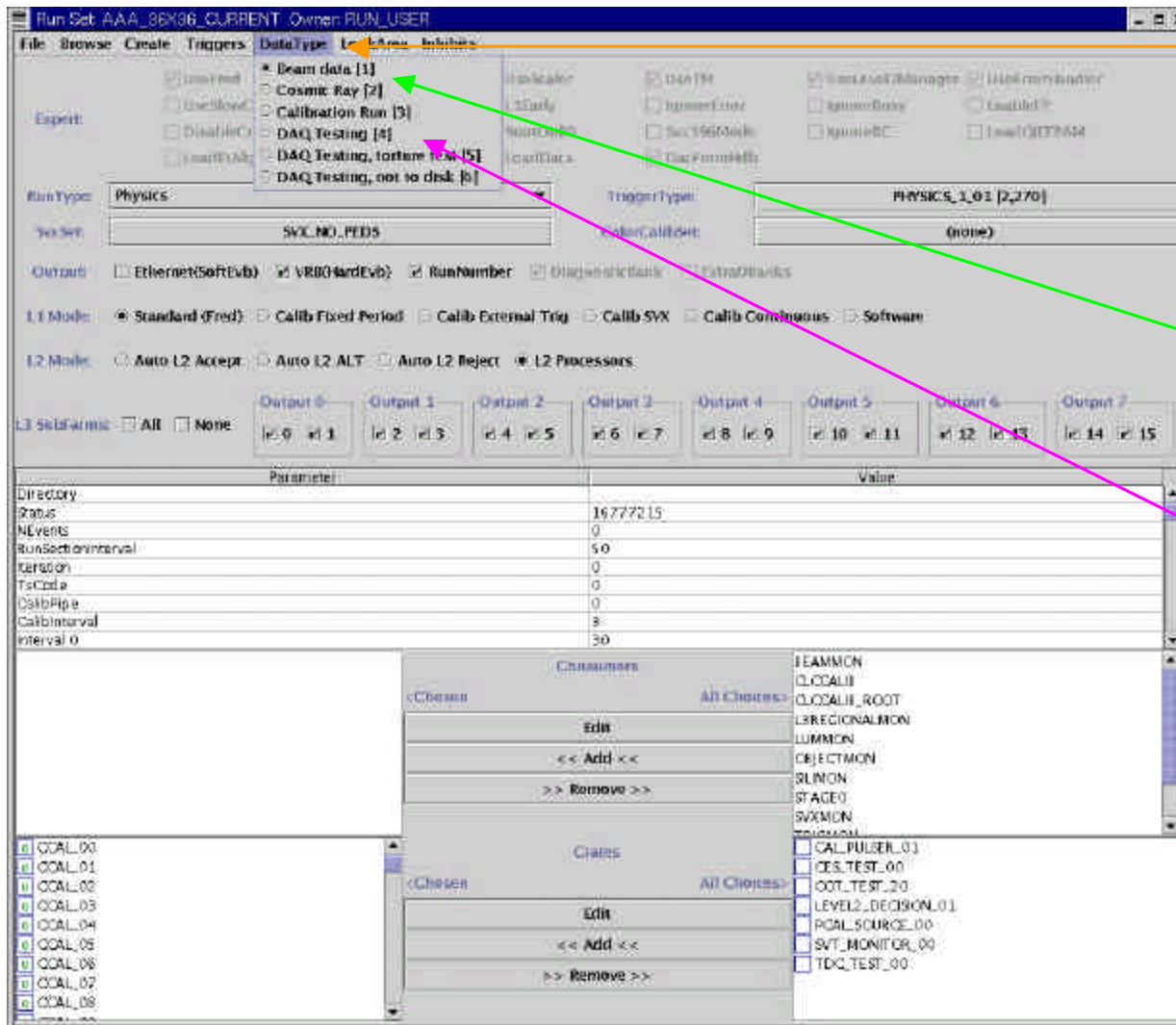
Jonatron sez.
"Inhibitions are the Ace's most important duty!"





Data Type Selection

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27-Mar-2002



Pull-down menu in Run Settings window selects data types

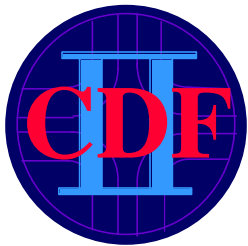
Select *Beam Data* only when colliding beams are in the Tevatron

Use DAQ Testing when just exercising the system

Tony sez:

“Selecting the Data Type is the Ace’s most important Duty”





Trigger Type Selection

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Run Control &
Run Configuration
27-Mar-2002

Run Set: AAA_38K38_CURRENT Owner: RUN_USER

File Browse Create Triggers Data Type Look Area Inhibits

List L3 Tag Sets

Level 1, 2 Special Trigger Types (decoupled from L3)

Run Type: Physics

Trigger Type: PHYSICS_L01 [2,270]

Calib Calibset: (none)

Output: Ethernet(SoftEvb) VRB(HardEvb) RunNumber HighLevelBank ExtraDBank

L1 Mode: Standard (Prod) Calib Fixed Period Calib External Trig Calib SVX Calib Continuous Software

L2 Mode: Auto L2 Accept Auto L2 ALT Auto L2 Reject L2 Processors

L3 Subarms: All None

Output 0 Output 1 Output 2 Output 3 Output 4 Output 5 Output 6 Output 7

Parameter Value

Parameter	Value
Directory	
Status	14777213
NEvents	0
RunSectionInterval	50
Iteration	0
TicCode	0
Calib Pipe	0
Calib Interval	3
Interval 0	50

Choices

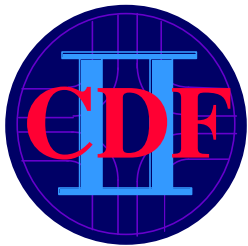
Crates

Select *coupled*
Trigger Table here
for normal physics
running

Select decoupled
tables here for
testing purposes

Coupled tables
are fully
specified from
Level 1, Level 2
through Level 3

Synonyms:
Trigger Type =
Trigger Table =
Physics Table



Decoupled Trigger Tables

W. Badgett
Run Control &
Run Configuration
27-Mar-2002

Trigger Type Selector

Select a single row of parameters from the list of choices below

PHYSICSTABLE	TAG	L3	DESCRIPTION	CREATED
COMSICS_NOTRACKS	3	233	4.2.0 cosmics table	2001.06.05
COMSICS_NOTRACKS	3	232	4.2.0 Null table	2001.06.05
COSMICS	6	233	4.2.0 cosmics table	2002.03.25
COSMICS	6	232	4.2.0 Null table	2002.03.25
COSMICS	5	233	4.2.0 cosmics table	2001.08.21
COSMICS	5	232	4.2.0 Null table	2001.08.21
COSMICS_NOTRACKS	3	233	4.2.0 cosmics table	2002.03.21
COSMICS_NOTRACKS	3	232	4.2.0 Null table	2002.03.21
COSMICS_NOTRACKS_NOUNPACK	2	233	4.2.0 cosmics table	2002.03.21
COSMICS_NOTRACKS_NOUNPACK	2	232	4.2.0 Null table	2002.03.21
Cosmics_All	2	233	4.2.0 cosmics table	2001.06.05
Cosmics_All	2	232	4.2.0 Null table	2001.06.05
DIFFRACTIVE TEST NOSPIKES	1	233	4.2.0 cosmics table	2002.02.28

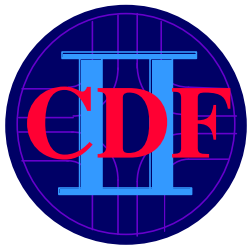
Select None Cancel

Lots of *decoupled* trigger table options, due to combinatorics of unspecified Level 3 paths

None is a valid option when using the calibration trigger



Kirsten sez:
"Level 3 Rules!"



Coupled Trigger Tables

W. Badgett
Run Control &
Run Configuration
27-Mar-2002

Trigger Type Selector

Select a single row of parameters from the list of choices below

PHYSICSTABLE	TAG	L3	DESCRIPTION	CREATED
PHYSICS_1_01	4	275	Added new path AAAAA_ALL_RECO to temporarily sol...	2002.03.22
PHYSICS_1_01	3	271	Physics_1_01 v3 Track Mass correction	2002.03.20
PHYSICS_1_01	2	270	PHYSICS_0_01 v2 4.3.0. Dropped L2GlobalTrigger li...	2002.03.13
PHYSICS_LL3_AUTO_1_01	1	273	PHYSICS_LL3_AUTO_1_01 v1	2002.03.21
PHYSICS_TEST_1_01	7	272	PHYSICS_TEST_1_01 v7 including ALL_RECO_ELECTR...	2002.03.21
PHYSICS_TEST_1_01	6	269	PHYSICS_TEST_1_01 v6 4.3.0	2002.03.13
PHYSICS_TEST_1_01	5	268	PHYSICS_TEST_1_01 v5 4.3.0	2002.03.08
SVT_CALIBRATION	4	274	Test table for SVT-Only calorimetry and tracking are ...	2002.03.21

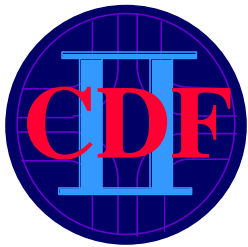
Select None Cancel

Coupled Trigger Tables are used for real physics (colliding beams) running

Your Ops Manager will tell you which one to use and which are for special test runs

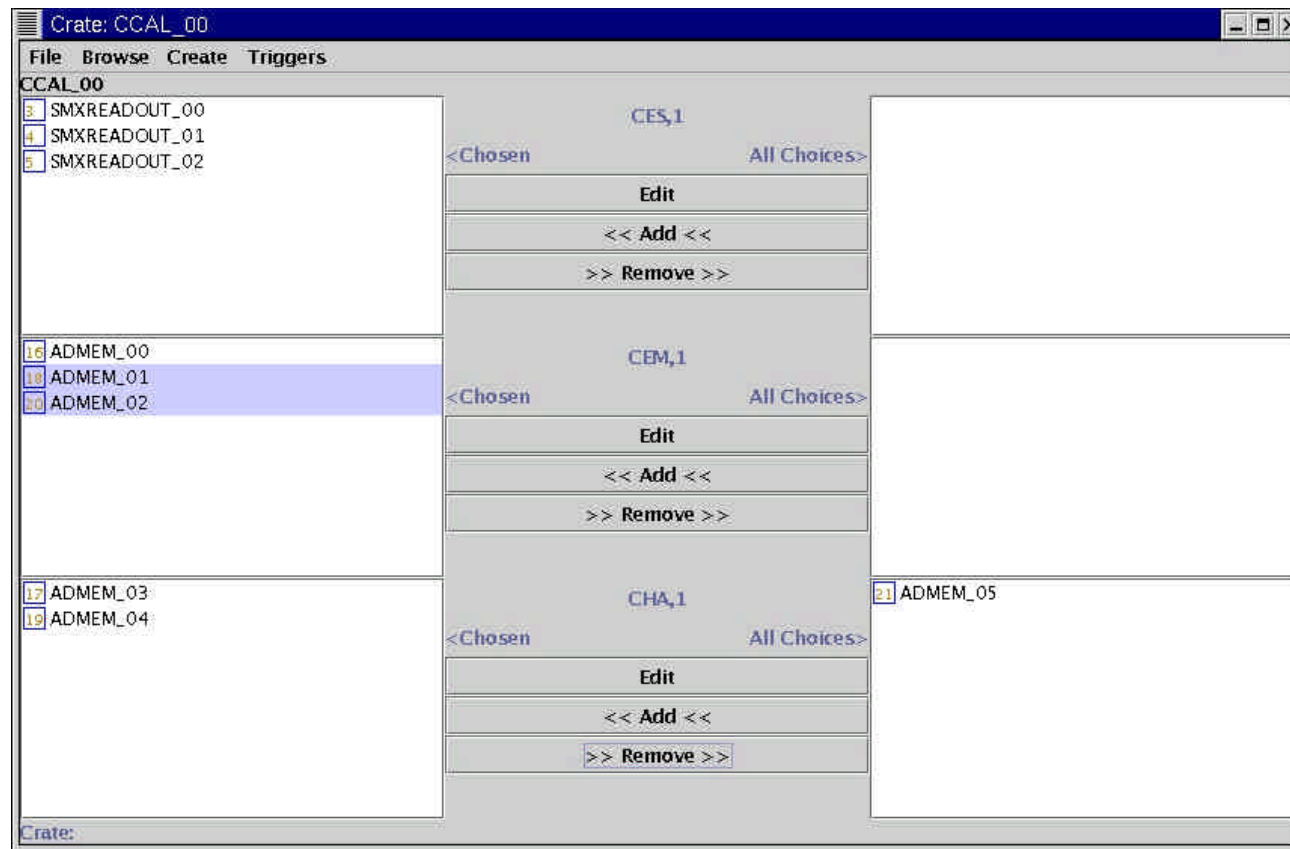


Greg Sez: "Selecting the correct Trigger Table is the Ace's most important duty!" (plus bringing Greg Krispy Kreme doughnuts)



Crate Editor

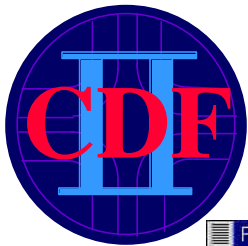
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CrateEditor shows
which cards will be
read out, grouped
by bank

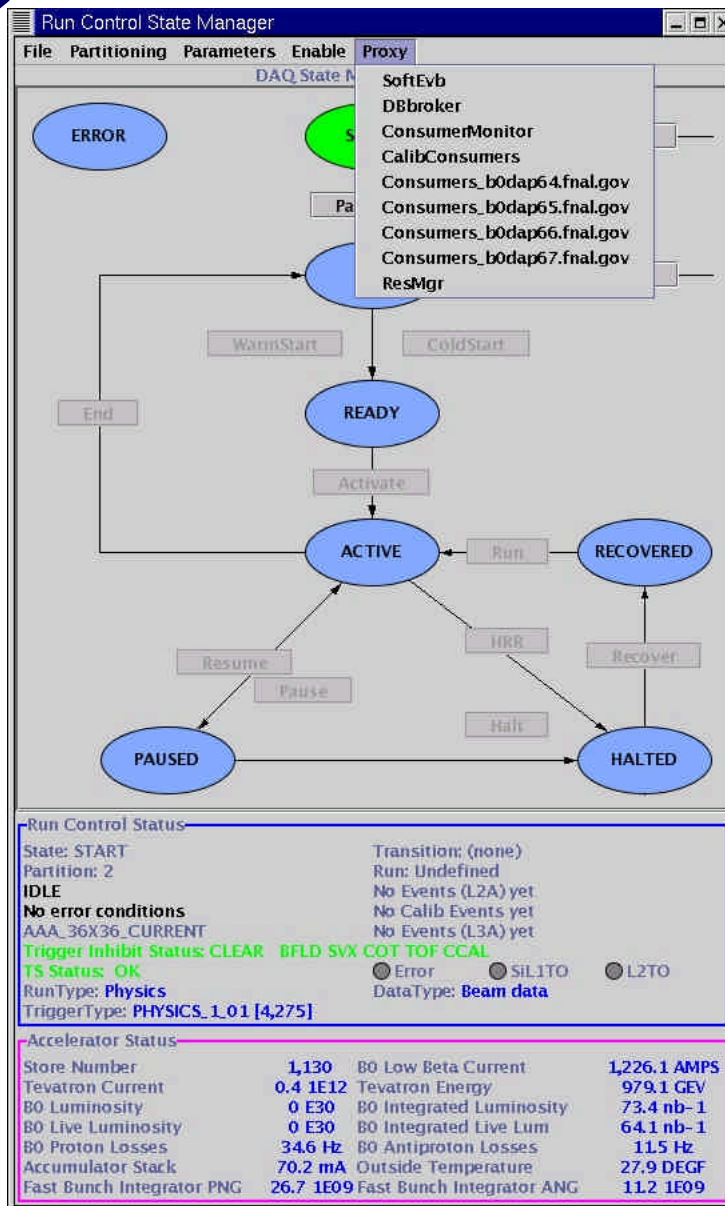
Cards can be
removed from
readout, but
only in
emergencies
Notify expert
immediately if
you remove a
card!

Component expert? Select card and press *Edit* for
more info on the card
Use caution when changed database connection



Proxy Control Menu

W. Badgett
Run Control &
Run Configuration
27-Mar-2002



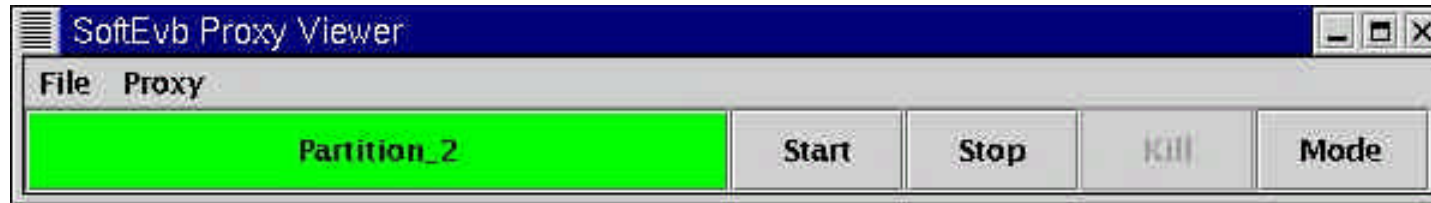
The Proxy gives you control over remote data acquisition processes:

- Software Event Builder
- Database Broker (not yet)
- Consumer Monitor
- Calibration Consumers
- Resource Manager
- Physics Consumers (to be implemented)



SoftEvb Proxy Viewer

W. Badgett
Run Control &
Run Configuration
27-Mar-2002



If you don't get responses from the Software Event Builder during transitions, then check the SoftEvb Proxy, and stop and/or restart if needed

Status colors:

- Green: Up and running
- Cyan: not running

Click on main button for detailed information

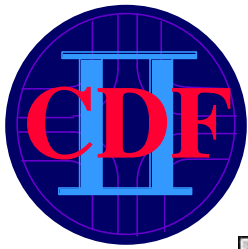


CalibConsumer Proxy

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Run Configuration
27-Mar-2002

QJE_0	Start	Stop	Kill	Mode
CESCALIB_0	Start	Stop	Kill	Mode
BSCQJE_0	Start	Stop	Kill	Mode
QJEMINIPLUG_0	Start	Stop	Kill	Mode
POTQJE_0	Start	Stop	Kill	Mode
COTCTT_0	Start	Stop	Kill	Mode
TOFQJE_0	Start	Stop	Kill	Mode
LED_0	Start	Stop	Kill	Mode
XEF_0	Start	Stop	Kill	Mode

Use the Calibration Consumer Proxy to see if your calibration consumer is still running

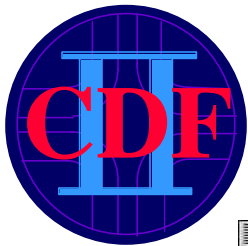


Resource Manager Proxy

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Run Configuration
27-Mar-2002

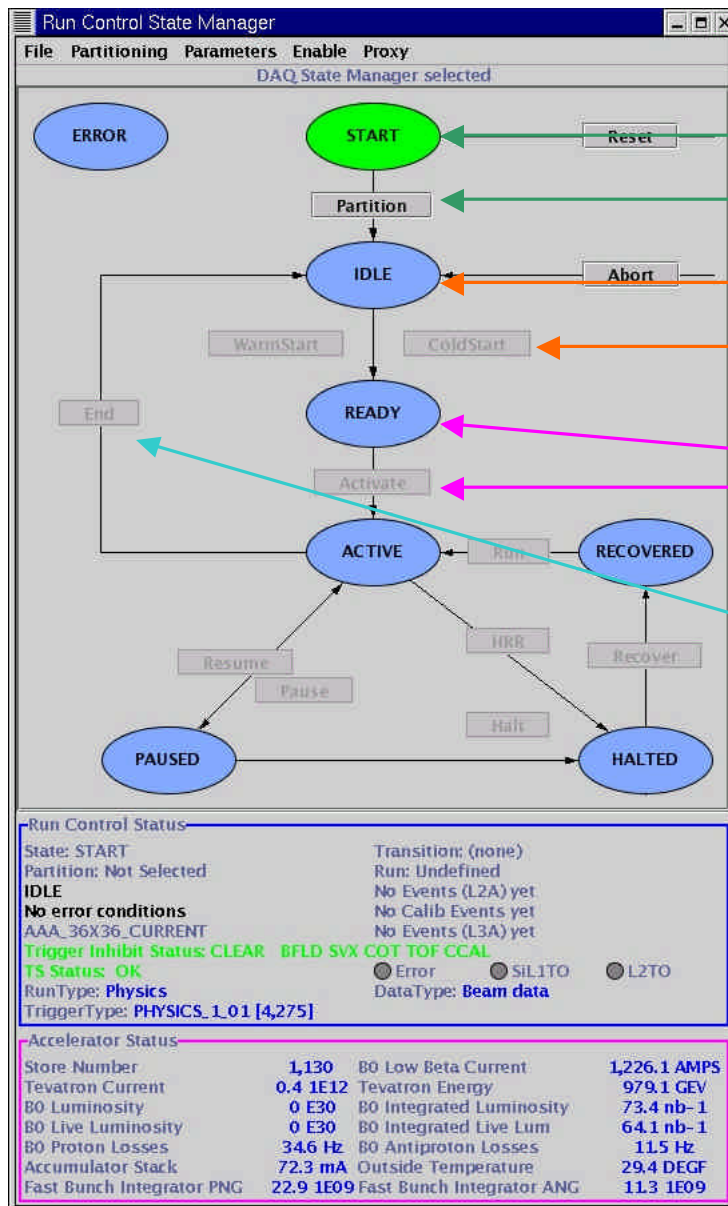
File	Proxy				
ResMgr_Prd		Start	Stop	Kill	Mode
ResMgr_Int		Start	Stop	Kill	Mode
ResMgr_Dev		Start	Stop	Kill	Mode
DBMon_Prd		Start	Stop	Kill	Mode
DBMon_Int		Start	Stop	Kill	Mode
DBMon_Dev		Start	Stop	Kill	Mode
DBMon_OffPrd		Start	Stop	Kill	Mode
HMon_Prd		Start	Stop	Kill	Mode
HMon_Int		Start	Stop	Kill	Mode
HMon_Dev		Start	Stop	Kill	Mode
SVX_BootLoader		Start	Stop	Kill	Mode

Having a problem with Sticky Partitions?
Try restarting the ResMgr_Prd
You can't hurt anything!



Transition Sequencing

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Run Configuration
27-Mar-2002



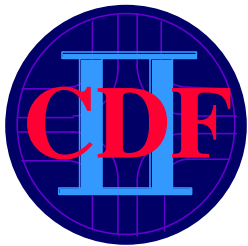
At *Start* state, select all desired clients and *Partition*

At *Idle* state, configuration must be fixed, then *ColdStart*

At *Ready* state, *Activate*

When *Active* and ready to finish run, *End*
To fix timeouts, try *Halt Recover Run*

Abort and *Reset* always available to get you out of sticky situations
Use sparingly!



Transitions

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Run Control &
Run Configuration
27-Mar-2002

- **Partition**: Select front end crates and clients for the run; configure trigger and return crosspoints
- **WarmStart/ColdStart**: Configure crates and clients with info that could change run by run (slow)
 - **ColdStart**: Full download (when in doubt, ColdStart)
 - **WarmStart**: Selected clients do limited download when no changes
- **Activate**: Final step to enable system to take data (fast)
- **End**: Normal end of run, produces end of run summaries
- **Abort**: Return to Idle when no other option available
- **Pause**: Briefly stop data taking (HV trips, flying wires, inhibits)
- **Halt/Recover/Run**: Fast system error recovery



Calibration State Managers

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Run Configuration
27-Mar-2002

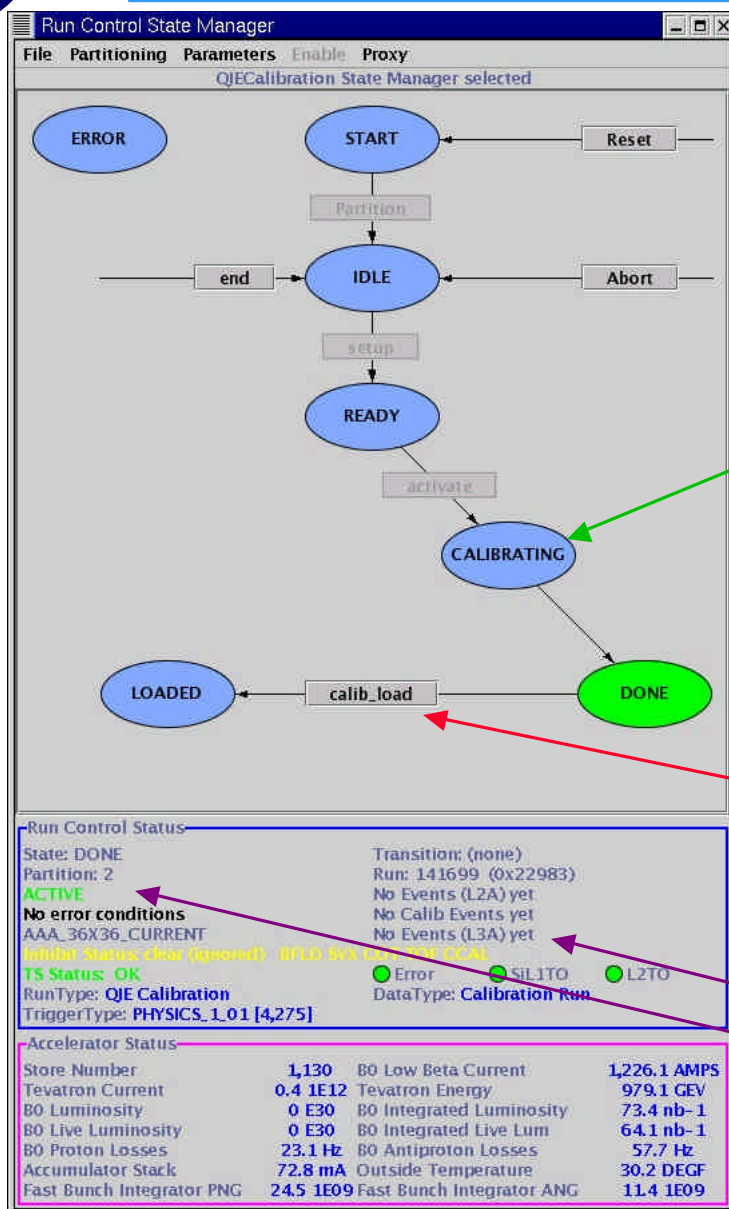
QIE Calibration State Manager

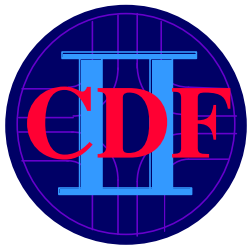
Calibrating: Transitory state, will drop to Done when all front end crates are complete

Know where Calibration Consumer log files are kept:
~cdfdaq/consumers/log

CalibLoad special option to do full download of AdMem FRAMs, by expert request only

Calibration may be done in software, no hardware triggers are generated





Sample Transition Errors

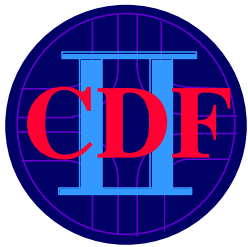
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27-Mar-2002

```
*** Run Configuration Invalid ***  
File  
Strange (but not necessarily fatal) Run Configuration  
CSL Host b0dau32, not the suggested b0dap60  
for RunType QIE Calibration  
DataType is Beam data [1], but Calibration Run [3] ex  
Crate CCAL_00 missing from run  
Crate CCAL_01 missing from run  
Crate CCAL_02 missing from run  
Crate CCAL_03 missing from run  
Crate CCAL_04 missing from run  
Crate CCAL_05 missing from run  
Crate CCAL_06 missing from run  
Crate CCAL_07 missing from run  
Crate CCAL_08 missing from run  
Crate CCAL_09 missing from run  
Crate CCAL_10 missing from run  
Crate CCAL_11 missing from run  
Crate CCAL_12 missing from run  
Crate CCAL_13 missing from run  
Crate CCAL_14 missing from run  
Crate CCAL_15 missing from run  
Crate CLC_00 missing from run  
Crate CLC_01 missing from run  
Crate CMP_00 missing from run  
Crate CMU_00 missing from run  
Crate CMU_01 missing from run  
Crate COT_00 missing from run  
Crate COT_01 missing from run
```

During your Run Control session, you will sometimes see warning messages pop up
This example tells you are missing some important crates during a beam physics run

Do **NOT** ignore any of these messages!

If you do not understand a message, contact the appropriate expert immediately



Reply & Acknowledgments Window

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Run Control &
Run Configuration
27-Mar-2002

Parth 7:	b0cot03
b0puls01	b0tsi00
b0tsi01	b0tsi02
csl	errlog
sevb07	

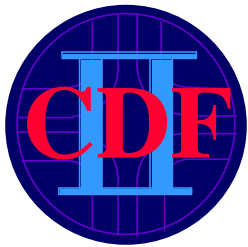
Window should
always be visible

Words too small to read?
Stretch the window!

This window indicates the transition status of clients:

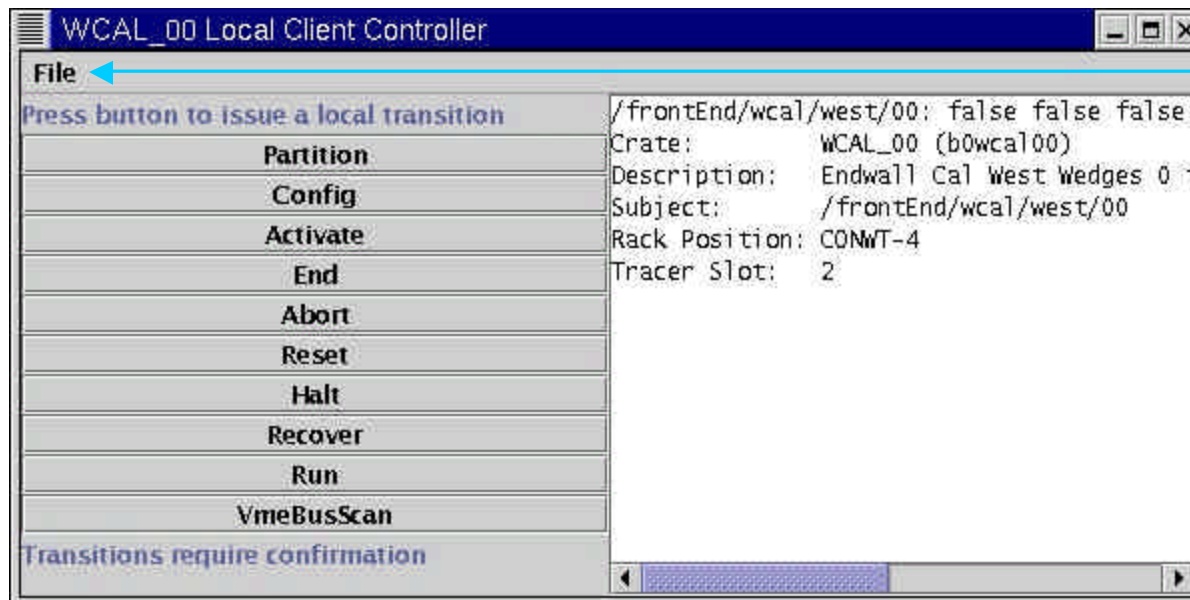
- Butter yellow: RC has not sent transition
- Margarine yellow: RC has send transition, waiting for acknowledgment
- Green Client sent successful acknowledgment
- Red Client sent error

Click on the client button for more info and the client's
Local Controller



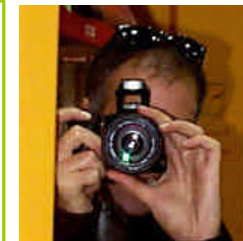
Local Client Controller

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Run Configuration
27-Mar-2002

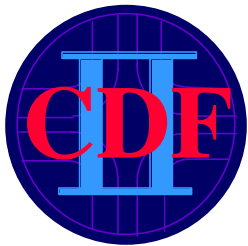


File menu gives you access to the contents of the configuration messages sent to the client

Allows you to shepherd individual clients through the transitions
Can be used if one client out of many fail a transition
Be careful to retain the same configuration!!



Avi sez: "We need a mouse click database!"



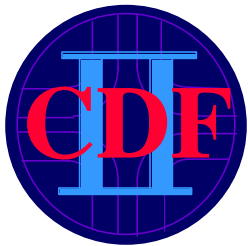
VmeBusScan Button

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Run Configuration
27-Mar-2002

```
b0wcal00 VmeBusScan
File
VmeBusScan message
PartitionId:      2
IpAddress:        131.225.237.108
Ethernet:         08:00:3e:27:c0:ad
SystemNumber:
Slot: 2  Id: 0097 001 TRACER_V2.1A
Slot: 5  Id: 0237 003 ADMEM_V4.0      470
Slot: 6  Id: 0366 003 ADMEM_V4.0      460
Slot: 7  Id: 0179 003 ADMEM_V4.0      470
Slot: 8  Id: 0087 003 ADMEM_V4.0      470
Slot: 9  Id: 0364 003 ADMEM_V4.0      460
Slot: 10 Id: 0202 003 ADMEM_V4.0      460
Slot: 16 Id: 0207 003 ADMEM_V4.0      470
Slot: 17 Id: 0090 003 ADMEM_V4.0      470
Slot: 18 Id: 0111 003 ADMEM_V4.0      470
Slot: 19 Id: 0165 003 ADMEM_V4.0      470
Slot: 20 Id: 0128 003 ADMEM_V4.0      470
Slot: 21 Id: 0121 003 ADMEM_V4.0      470
```

Choosing VmeBusScan
from the Local Controller
window returns a scan of all
cards in the front end crate

Useful for verifying the
presence and basic
functionality of readout
cards

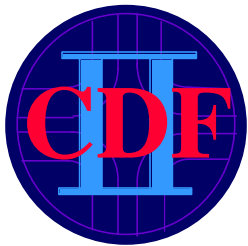


End of Run Status Box

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At the end of a run you will be presented with a comment box: enter any pertinent run informations

At the end of a beam physics run, you must also decide the basic run quality. When in doubt, choose *Potentially Good*
Determines whether run is processed offline!



Error Logger

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Run Configuration
27-Mar-2002

The screenshot shows a window titled "Error Display (current version = v1_05_1)". It has a menu bar with "File", "Log", "Options", "Tools", and "Help". Below the menu bar are buttons for "Stop log file" and "Clear". The main text area displays the following log entries:

```
ColdStart DAQ badgett@b0dap13.fnal.gov 11:36:51 run #: 141704(0x22988)
readout sent events mismatch(EOR)
(EOR) SoftEvB: 160 started, 160 completed, 160 assembled, 160 dispatched, 0 timed o
(EOR) SoftEvB: 1440 valid, 0 missing, 0 repeated, 0 invalid, 0 discarded, 0 early, 0 late s
(EOR) CSL: Normal end; 160 events received, 160 sent to loggers, 160 logged.
(EOR) CSL: stream 0, 0 events received, 0 events logged.
(EOR) CSL: stream 1, 0 events received, 0 events logged.
(EOR) CSL: stream 2, 0 events received, 0 events logged.
(EOR) CSL: stream 3, 0 events received, 0 events logged.
(EOR) CSL: stream 4, 0 events received, 0 events logged.
(EOR) CSL: stream 5, 0 events received, 0 events logged.
(EOR) CSL: stream 6, 0 events received, 0 events logged.
(EOR) CSL: stream 7, 0 events received, 0 events logged.
(EOR) CSL: stream 8, 160 events received, 160 events logged.
(EOR) CSL: stream 9, 0 events received, 0 events logged.
(EOR) End of Run System Summary
(EOR) FE (ts trigg. ev.) SoftEvB (compl) CSL (received)
(EOR)      0      160      160
(MLE) b0dap13.fnal.gov:AWT-EventQueue-0:11:36:24 AM->Strange (but not necessarily
Crate CCAL_00 missing from run
```

Below the main text area are two tabs: "Time sequence" and "Argument sequence". The "Time sequence" tab is selected and shows the following error messages:

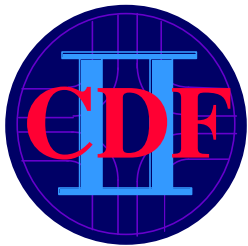
```
Crate VRB_SVX_04 missing from run
Crate VRB_SVX_05 missing from run
Crate XFT_FINDER_00 missing from run
Crate XFT_FINDER_02 missing from run
Crate XFT_FINDER_04 missing from run
Crate XFT_LINKER_01 missing from run
Crate XFT_LINKER_03 missing from run
Crate XFT_LINKER_05 missing from run
Crate XFT_XTRP_00 missing from run
IgnoreInhibit should not be set for DataType BEAM
```

At the bottom of the window, it says "partition 2 Listening... (1 mer.mess.)".

Error Logger receives and interprets status and error messages from front end crates and other clients

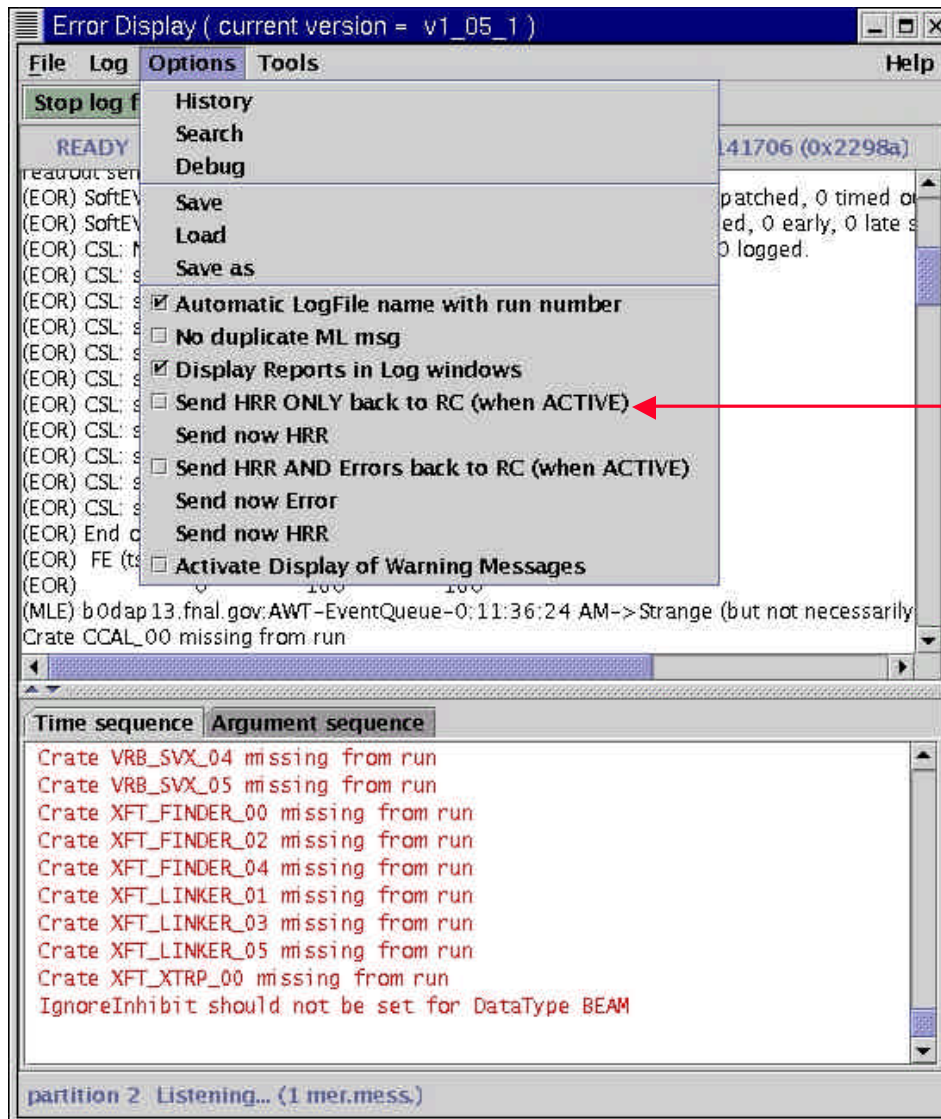
Status Messages

Error Messages



Error Logger Control Options

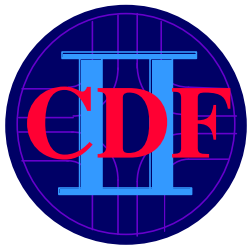
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Error Logger can send transition commands to Run Control when specific problems are encountered

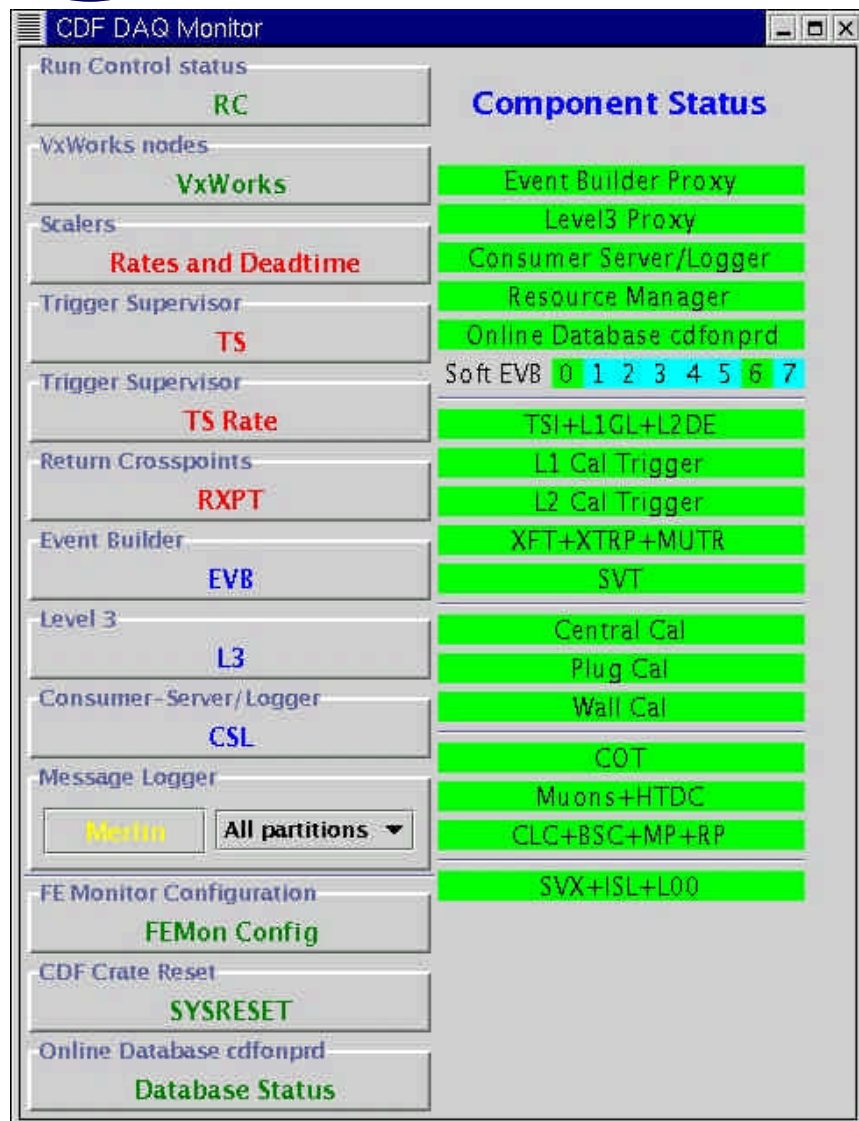
Enable automatic HRR here

Error Logger sends orange and red warning windows to Run Control



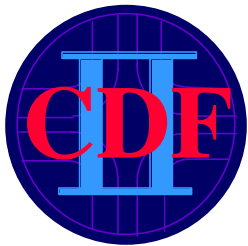
DaqMon

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27-Mar-2002



Watching Run Control status is
your first line of defense
Plus, many monitoring tools are
available

DaqMon is your gateway to
many monitors:
setup fer
daqmon
And provides a quick glimpse status
of all systems



VxMon

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27-Mar-2002

CDF VxWorks System Monitor

26-Mar-02 11:29:47

Help

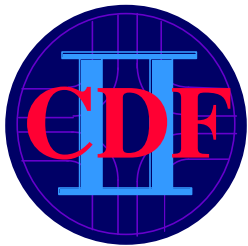
☐ b0tsi00 ... b0tsi03, b0vrb00 ... b0vrb05, b0svx00 ... b0svx08, b0fib00 ... b0fib07, b0clk00 ... b0puls01
☐ b0l1cl00 ... b0l1cl05, b0xft00 ... b0xft05, b0l1gl00, b0l2cl00 ... b0l2cl05, b0svt00 ... b0svt07, b0l2de00
☐ b0ccal00 ... b0ccal15, b0pcal00 ... b0pcal11, b0wcal00 ... b0wcal07, b0htdc00
☐ b0cot00 ... b0cot19, b0cmu00 ... b0mutr00, b0clc00 ... b0clc01, b0fcal00 ... b0fcal01

b0tsi00	T SHU	b0tsi01	T SHU	b0tsi02	T SHU	b0tsi03	T SHU	b0vrb00	T SHU	b0vrb01	T SHU	b0vrb02	T SHU	b0vrb03	T SHU	b0vrb04	T SHU
b0vrb05	T SHU	b0svx00	T SHU	b0svx01	T SHU	b0svx02	T SHU	b0svx03	T SHU	b0svx04	T SHU	b0svx05	T SHU	b0svx06	T SHU	b0svx07	T SHU
b0svx08	T SHU	b0fib00	T SHU	b0fib01	T SHU	b0fib02	T SHU	b0fib03	T SHU	b0fib04	T SHU	b0fib05	T SHU	b0fib06	T SHU	b0fib07	T SHU
b0clk00	T SHU	b0res00	T SHU	b0res01	T SHU	b0puls00	T SHU	b0puls01	T SHU	b0l1cl00	T SHU	b0l1cl01	T SHU	b0l1cl02	T SHU	b0l1cl03	T SHU
b0l1cl04	T SHU	b0l1cl05	T SHU	b0xft00	T SHU	b0xft01	T SHU	b0xft02	T SHU	b0xft03	T SHU	b0xft04	T SHU	b0xft05	T SHU	b0l1gl00	T SHU
b0l2cl00	T SHU	b0l2cl01	T SHU	b0l2cl02	T SHU	b0l2cl03	T SHU	b0l2cl04	T SHU	b0l2cl05	T SHU	b0svt00	T SHU	b0svt01	T SHU	b0svt02	T SHU
b0svt03	T SHU	b0svt04	T SHU	b0svt05	T SHU	b0svt06	T SHU	b0svt07	T SHU	b0l2de00	T SHU	b0ccal00	T SHU	b0ccal01	T SHU	b0ccal02	T SHU
b0ccal03	T SHU	b0ccal04	T SHU	b0ccal05	T SHU	b0ccal06	T SHU	b0ccal07	T SHU	b0ccal08	T SHU	b0ccal09	T SHU	b0ccal10	T SHU	b0ccal11	T SHU
b0ccal12	T SHU	b0ccal13	T SHU	b0ccal14	T SHU	b0ccal15	T SHU	b0pcal00	T SHU	b0pcal01	T SHU	b0pcal02	T SHU	b0pcal03	T SHU	b0pcal04	T SHU
b0pcal05	T SHU	b0pcal06	T SHU	b0pcal07	T SHU	b0pcal08	T SHU	b0pcal09	T SHU	b0pcal10	T SHU	b0pcal11	T SHU	b0wcal00	T SHU	b0wcal01	T SHU
b0wcal02	T SHU	b0wcal03	T SHU	b0wcal04	T SHU	b0wcal05	T SHU	b0wcal06	T SHU	b0wcal07	T SHU	b0htdc00	T SHU	b0cot00	T SHU	b0cot01	T SHU
b0cot02	T SHU	b0cot03	T SHU	b0cot04	T SHU	b0cot05	T SHU	b0cot06	T SHU	b0cot07	T SHU	b0cot08	T SHU	b0cot09	T SHU	b0cot10	T SHU
b0cot11	T SHU	b0cot12	T SHU	b0cot13	T SHU	b0cot14	T SHU	b0cot15	T SHU	b0cot16	T SHU	b0cot17	T SHU	b0cot18	T SHU	b0cot19	T SHU
b0cmu00	T SHU	b0cmu01	T SHU	b0cmu02	T SHU	b0cmu03	T SHU	b0cmu04	T SHU	b0cmu05	T SHU	b0cmu06	T SHU	b0cmu07	T SHU	b0cmu08	T SHU
b0mutr00	T SHU	b0clk00	T SHU	b0clk01	T SHU	b0fcal00	T SHU	b0fcal01	T SHU								

At-a-glance summary of all front end crates in the system

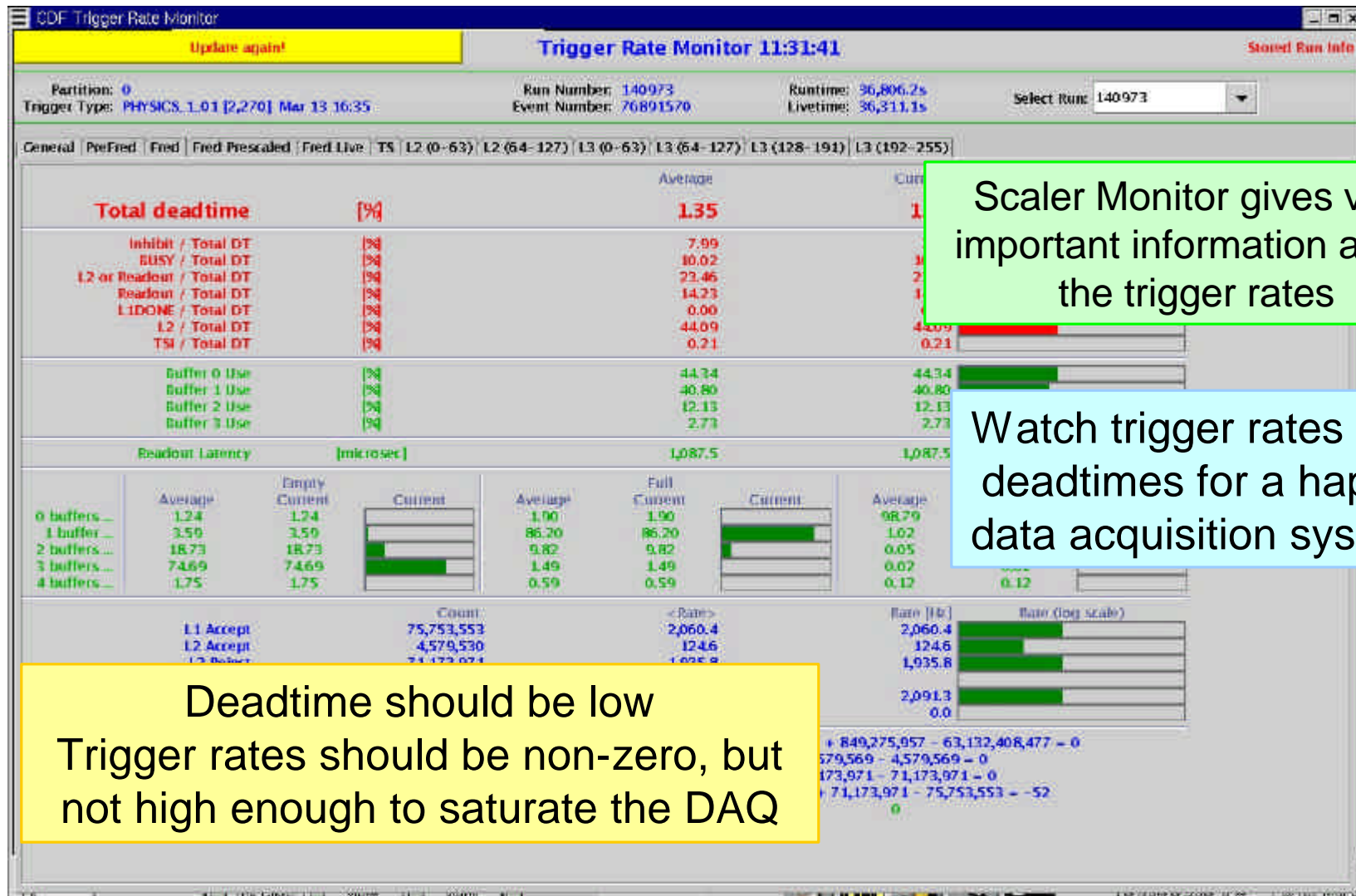
Arnd sez: "Monitoring the Front End crates is the Ace's most important job"

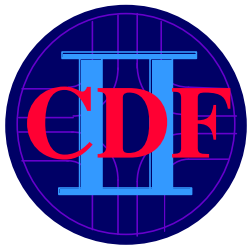




ScalerMonitor

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Run Control &
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27-Mar-2002





Conclusion

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27-Mar-2002

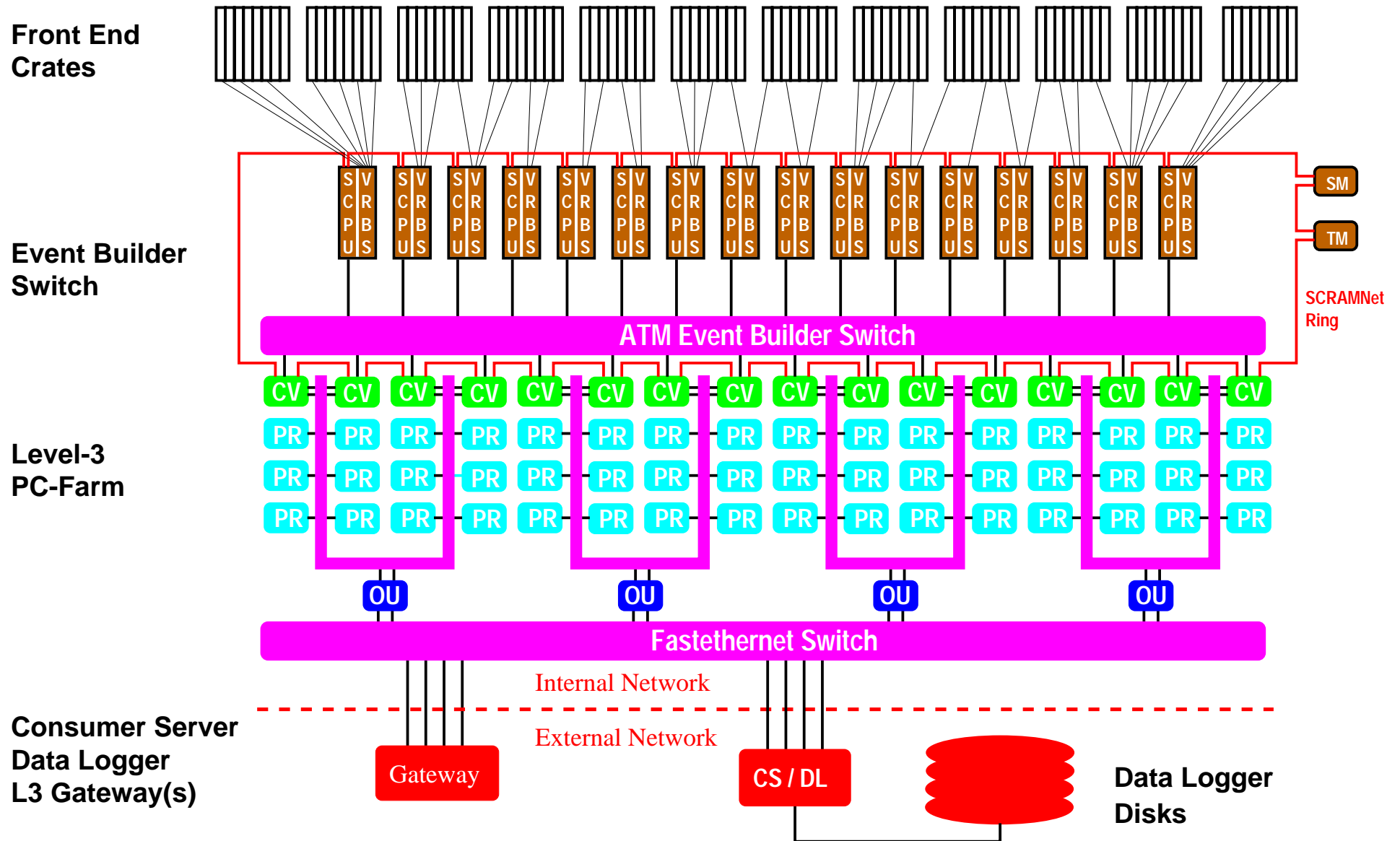
- DAQ Ace's main responsibility is operation of Run Control
- Before your shift, come to CDF control room and try out Run Control features, learn from experienced Aces and other DAQ experts
- Don't understand a feature or warning? Don't ignore! Find out! Page experts if necessary!

EVB & Level3 Overview for Aces

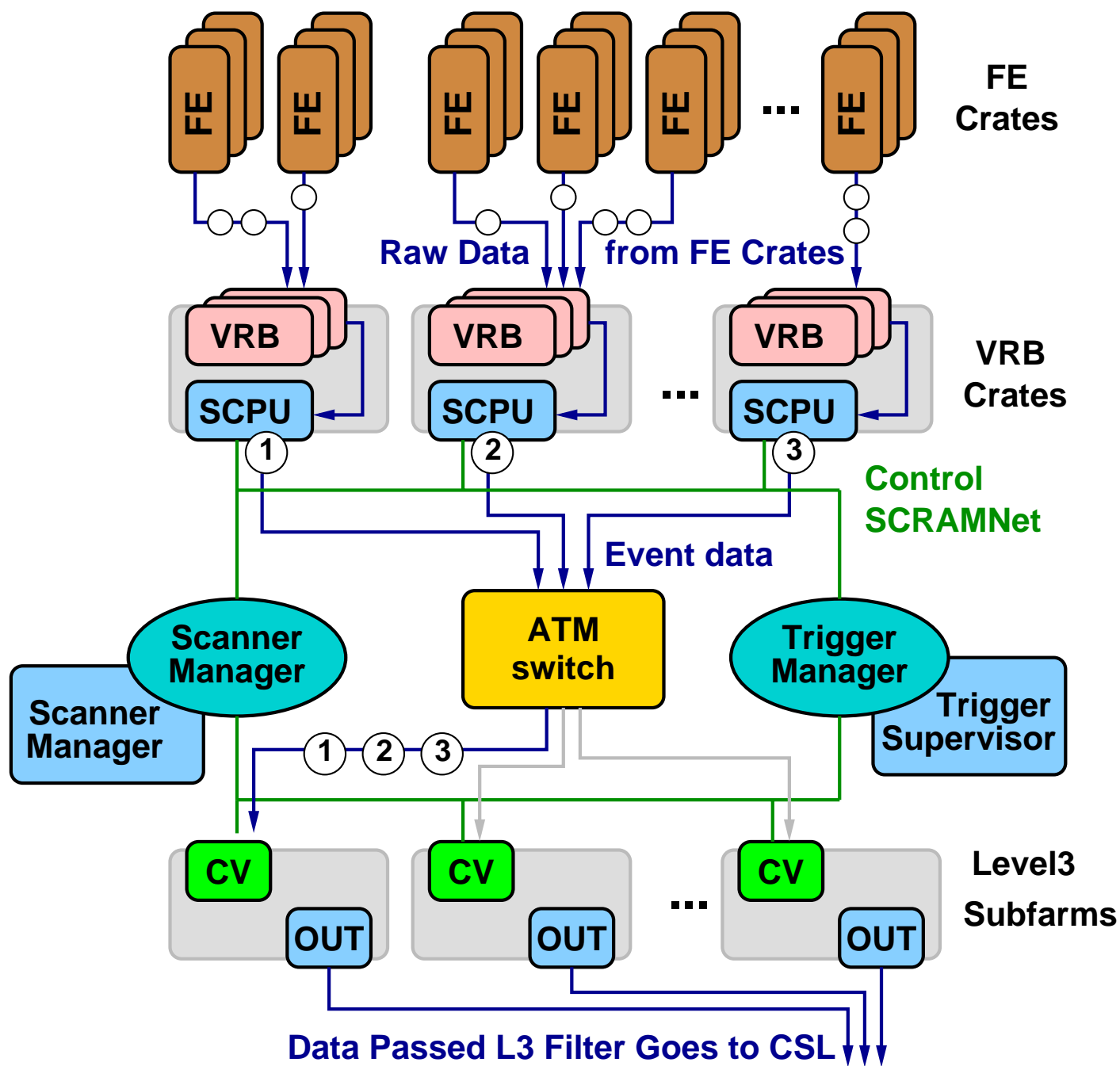
Arkadiy Bolshov
Massachusetts Institute of Technology

March 25, 2002

Level3.



Event Builder Overview



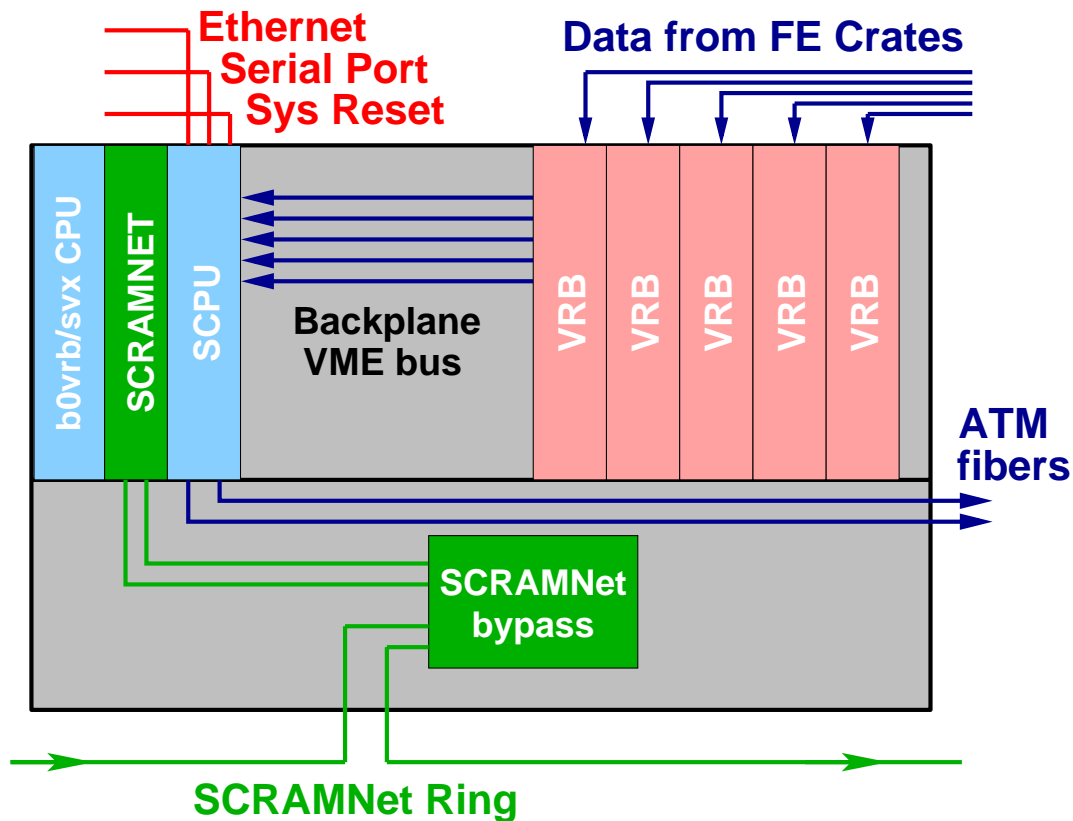
Event Builder :

Combines all event fragments from FE into one event.

Level3 :

Runs executable which makes L3 trigger decision.

VRB crate (a.k.a. SCPU or EVB crate)

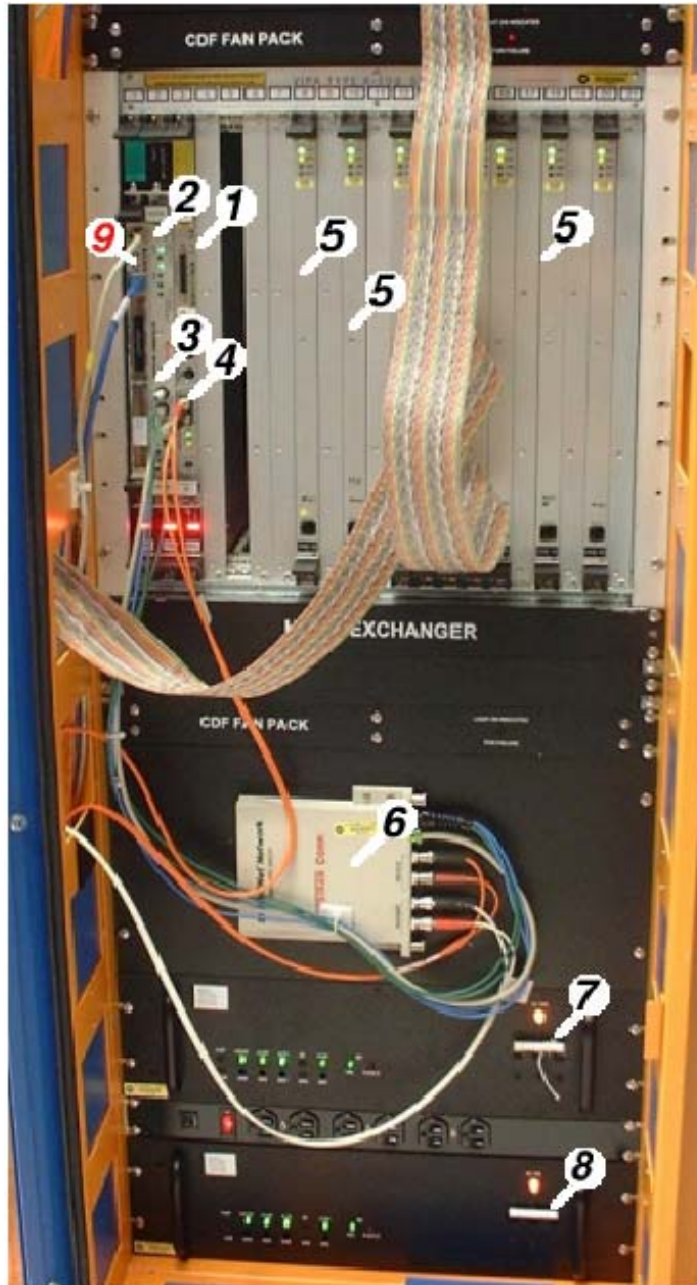


Functions:

- Event pieces (links) are loaded to VRBs by FE crates
- Scanner Manager (SM) detects L2 trigger from Trigger Manager
- Scanner Manager notifies SCPU's about trigger.
- Scanner CPU's (SCPU's) read VRB banks from VRBs concatenate them into one piece.
- All Scanner CPU's send event fragments through ATM to a single Converter chosen by SM.

Event Builder always talks to all SCPU's, so all VRB crates must be alive!

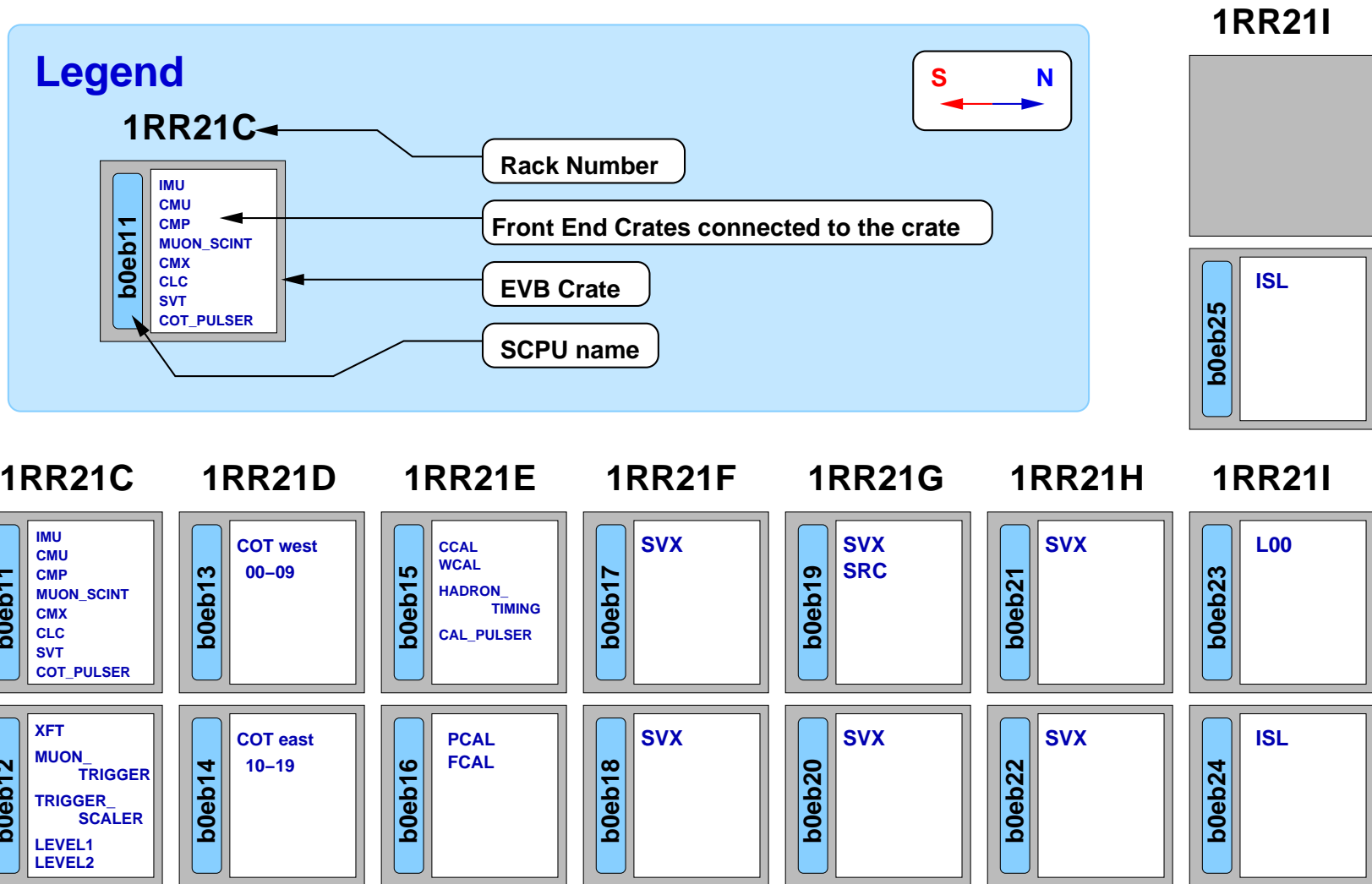
EVB Crate Possible Actions



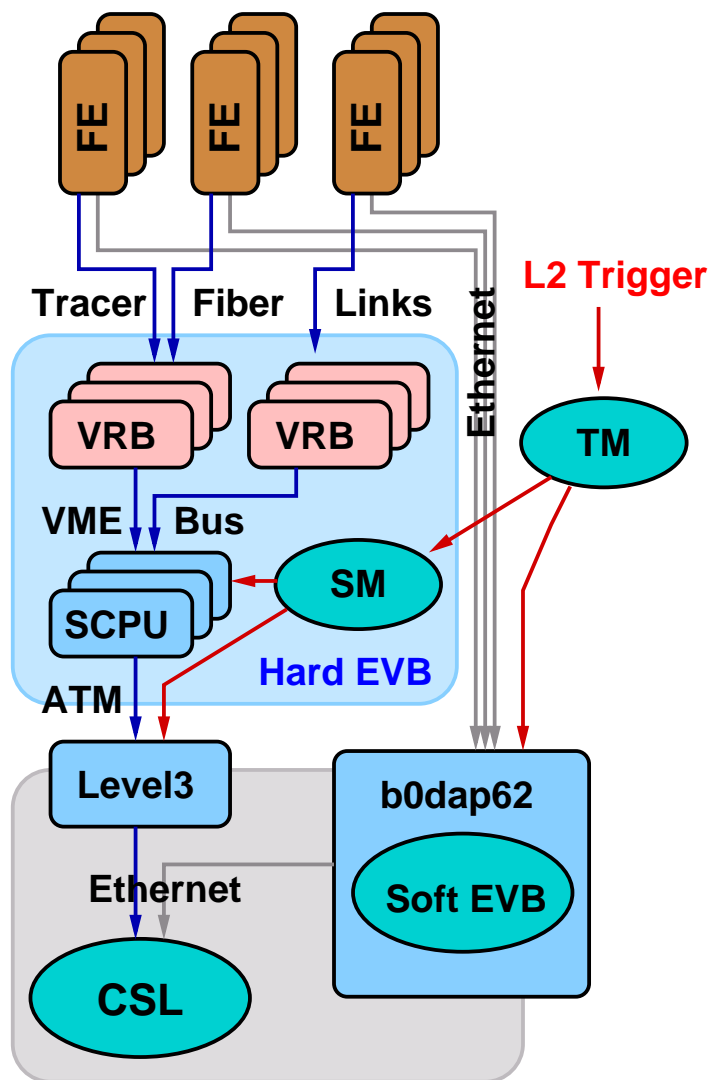
1. *SCPU Reset Button*
2. *ScramNet Card Lights*
3. *ScramNet Fibers*
4. *ATM Fibers*
5. *VRBs*
6. *ScramNet Bypass*
7. *Upper Crate Power Switch*
8. *Lower Crate Power Switch*
9. *Crate Reset Button*

- Reboot Crate - do software reboot from control room.
- Reset SCPU - push reset button on SCPU (slot 3)
- Reset Crate - push reset button on master board (slot 1). (Only if said by expert or popup window)
- Powercycle the Crate - Turn the power switch off, wait for 30 sec, turn it on. (Only if said by expert or popup window)

Running Multiple Hardware Partitions with L3/EVB.



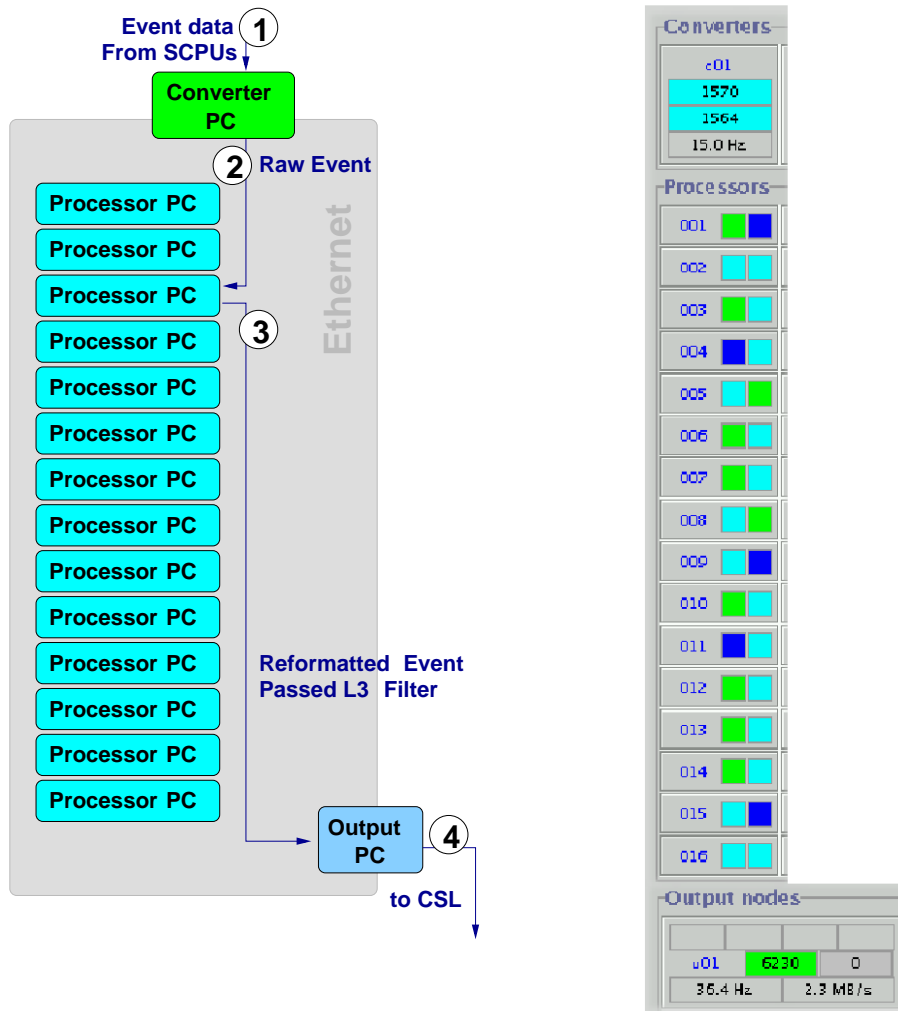
Software Event Builder



- Takes event data directly from FE crate by Ethernet.
- Runs data merger package, Reformatter and Level3 filter.
- Can work in Hardware or Software partitions.
- Generally much slower than Hardware EVB.

Do not page Hardware EVB pager about Software EVB problems.
:)

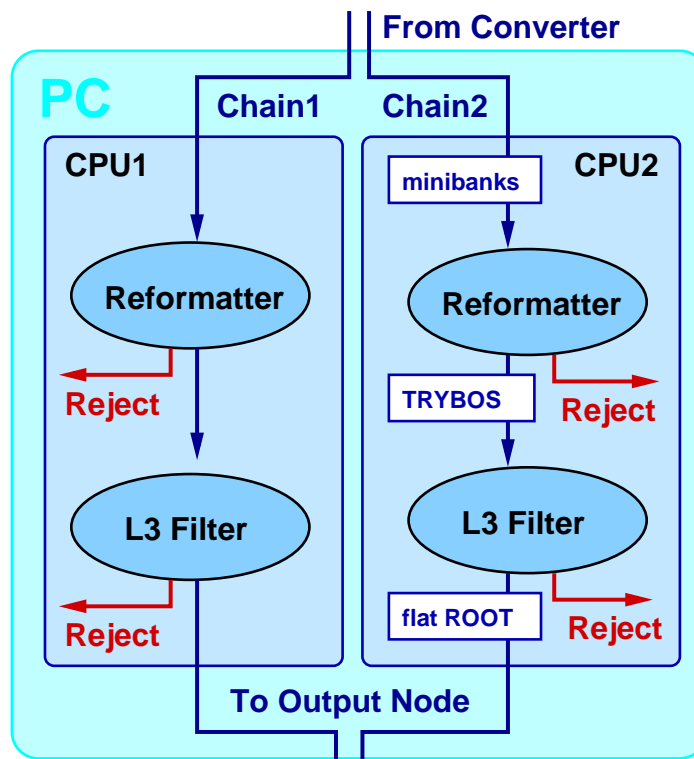
L3 subfarm definition



Functions:

1. Event fragments come to the Converter node from SCPUs.
2. Converter combines fragments into one piece (raw event) and sends it to free Processor node in a subfarm.
3. Processor PC rearranges event data to offline (TryBoss) format and applies L3 trigger. Passed events are written to the Output node.
4. Output node forwards event to CSL.

Processor node details



Two analysis chains are independent and process different events.
(Two boxes on Level3 Display)

Reformatter:

- Rearranges events to standard offline format
- Performs a number of data quality checks.
- Discards corrupted events
- Generate Reformatter error if event is rejected.

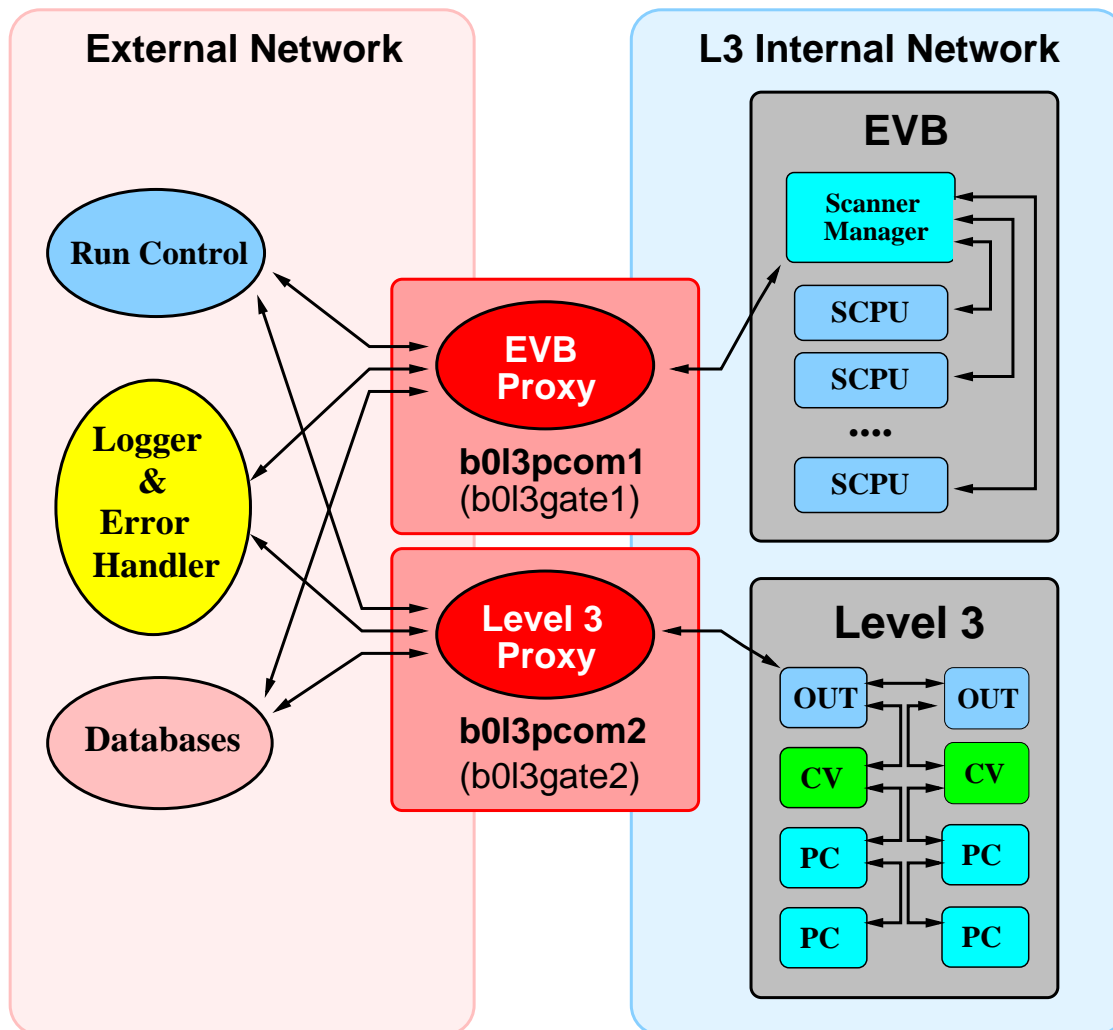
L3 Filter:

- Runs offline-type reconstruction
- Determines event type. Decides pass/fail
- Failed events are discarded

Events can be discarded by both Reformatter and L3 Filter!

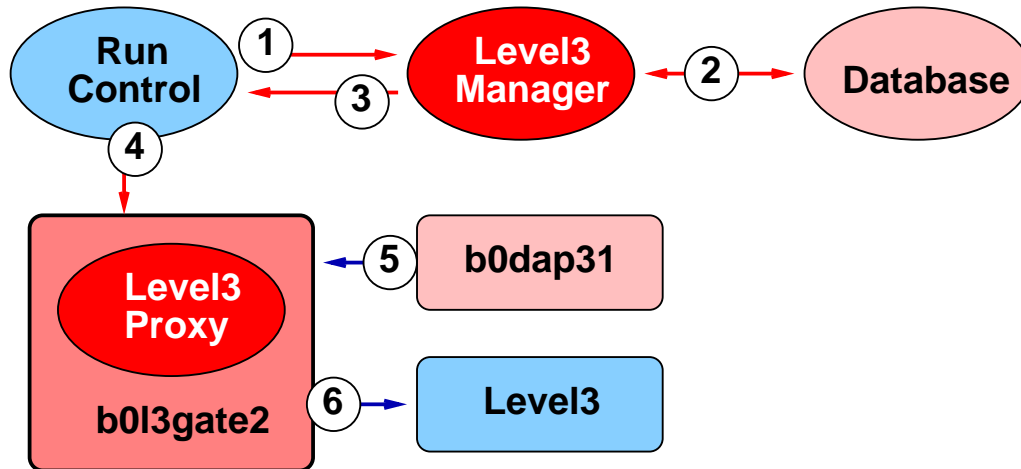
Level 3 Filter executable is selected in Run Control GUI

Gateways and proxies



- Connect RC and EVB/L3. Forward transition messages.
- Transport error messages to RC Error Logger.
- Transport monitoring information.
- Both must be alive for the system to work

Level3 Manager



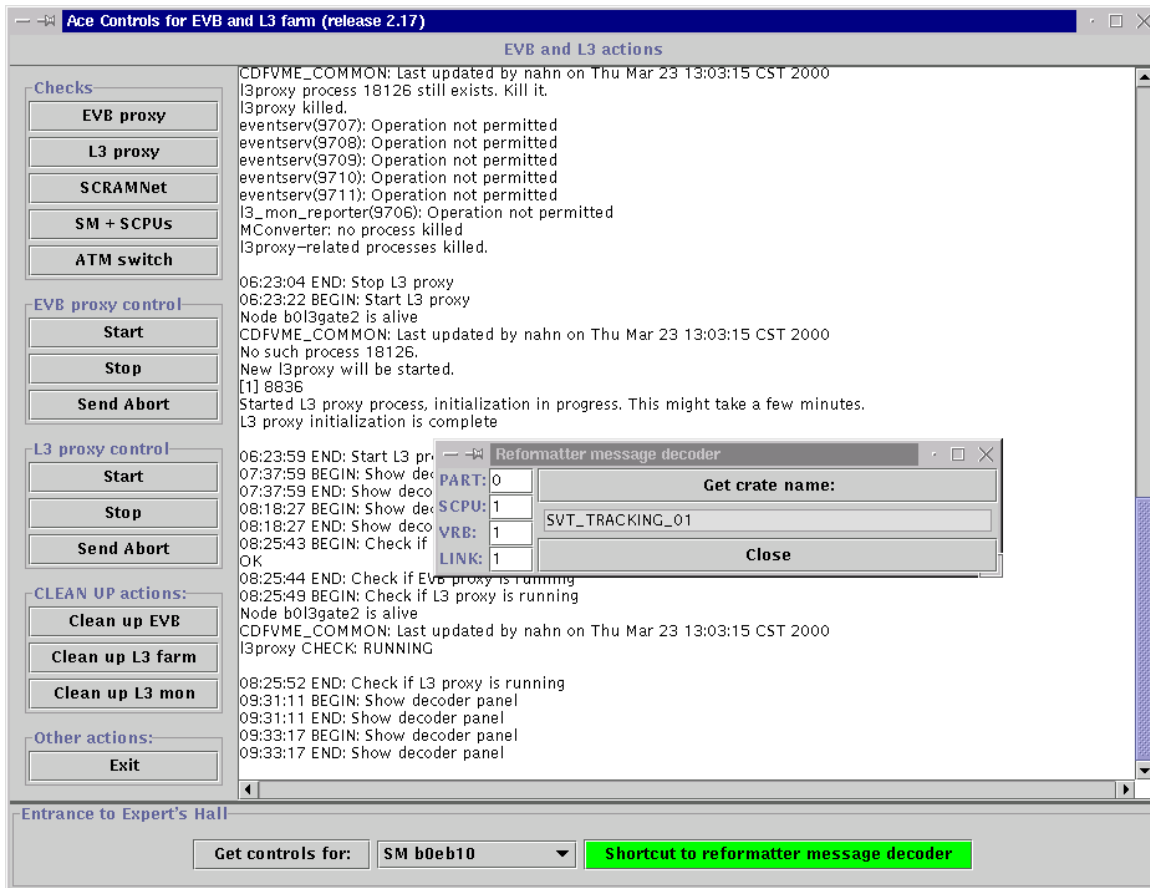
1. RC requests a new Calib tag from L3 Manager.
2. L3 Manager requests Database for a new Calib tag.
3. L3 Manager generates Calib tag if a new calibration exists. Return the Calib tag number to RC.
If this step is failed RC generates “orange window of death” and proceeds with default Calib tag.
4. RC notifies Level3 Proxy.
5. Level3 Proxy picks up Calib tag generated by L3 Manager from online computer.
6. Level3 Proxy distributes Calib tag over Level3 Farm.

Do not page Level3 pager about L3 Manager problems. :)

Monitoring Tools

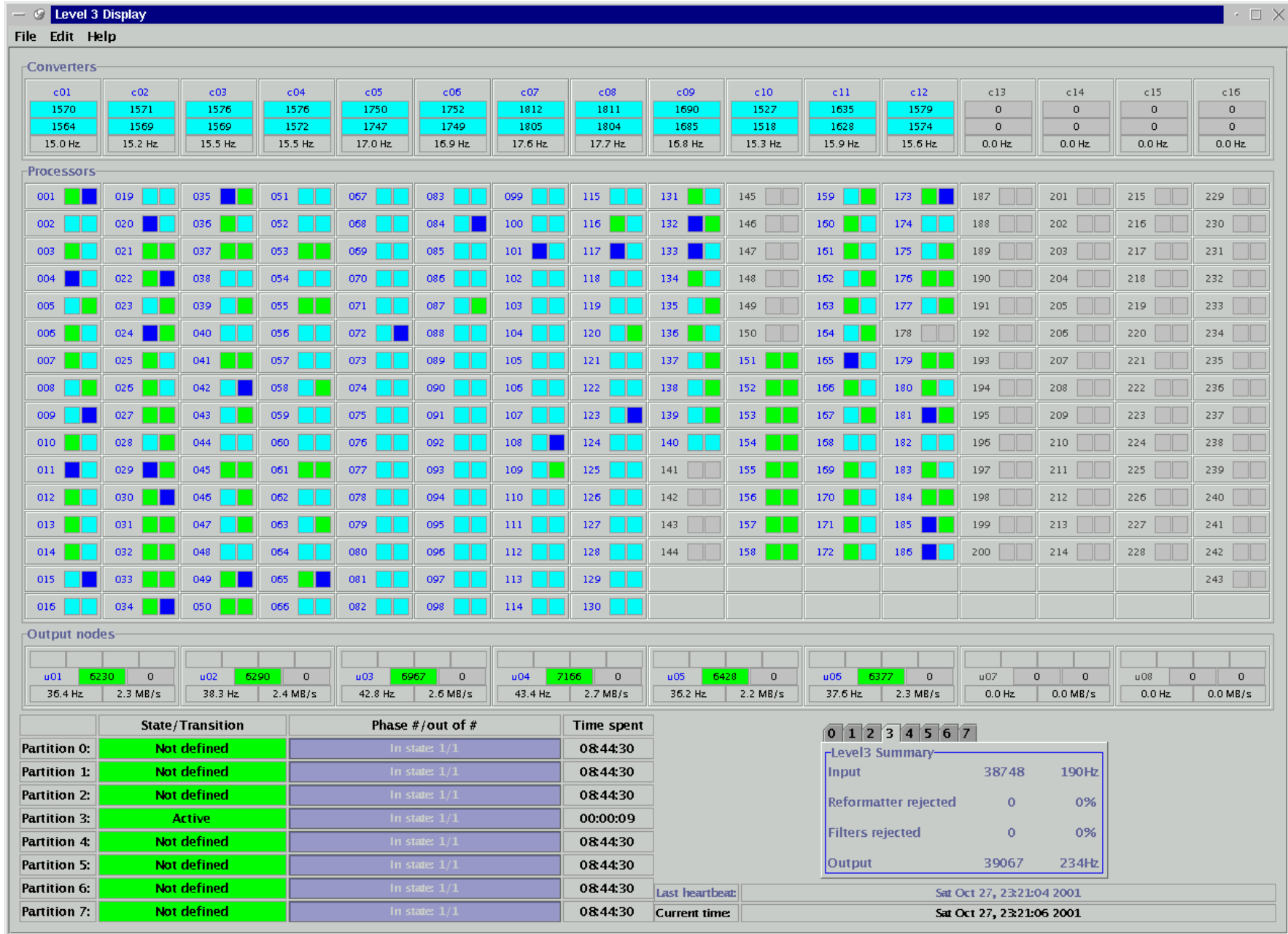
- EVB/L3 Ace Control Panel
 - go to EVB/L3 web page and follow instructions
- EvbMon
 - > setup fer
 - > daqmon
 - On daqmon GUI select EVB
- L3 Display
 - On daqmon GUI select L3
- Dead Time Display
 - On daqmon GUI select
- Error Handler
 - Started with Run Control.

EVB/L3 Ace Control Panel

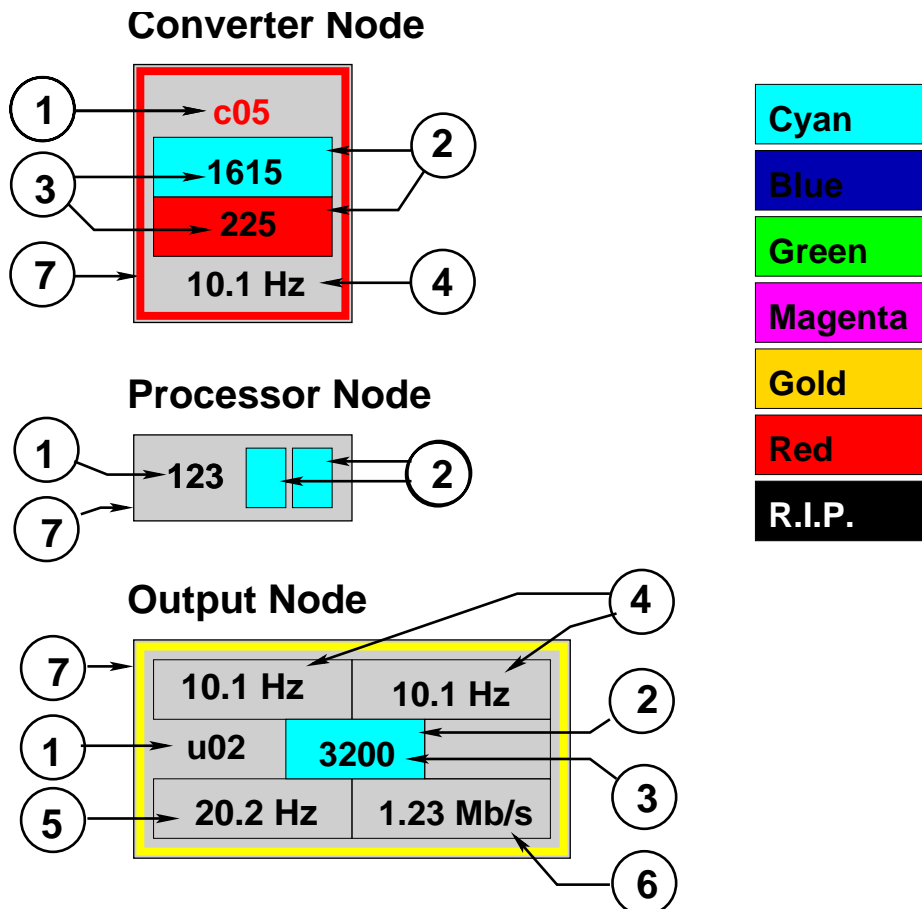


- Check status of primary components
- Start, stop proxies and do full cleanup of EVB and L3
- Reset state of any partition (e.g., in case of RC crashes)
- Gives access to EVB Expert GUIs and [Reformatter Decoder](#)

Level3 Display.

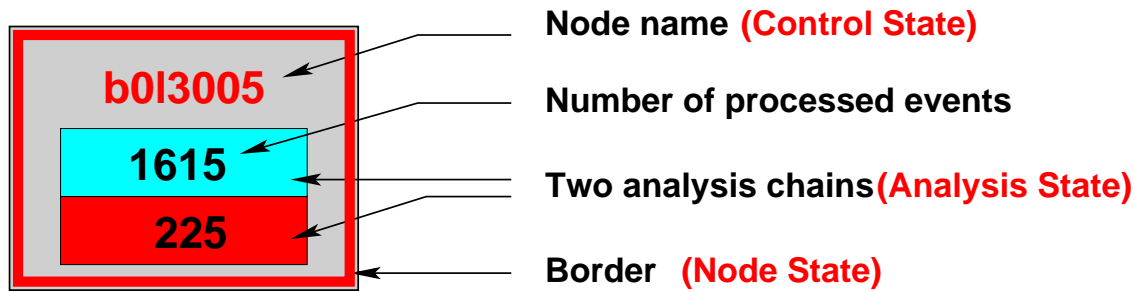


Level3 Display



1. Node name. Color coded *Control* state.
2. Color coded *Analysis Chain* state. Two per node.
3. Number of processed events. (Converter and Output only)
4. Event rate for the subfarm. (Converter and Output only)
5. Output event rate for the Output node. (Output only)
6. Output data rate for the Output node
7. Border. Color coded *System* state.

Level3 Display



Control State

- Error (red) - Level3 Errors (Click on the box to see Error messages).

Analysis State

- Input (Cyan) - Waiting for input.
- Busy (Dark Blue) - Chain is busy with event.
- Output (Green) - Waiting for output
- End (Magenta) - Node ended the run.
- Old (Gold) - Not updated. Probably monitoring failure.
- Dead (Red) - L3 Filter crashed. All necessary procedures are done automatically at the end of run.
- Unpingable (Black) - No connection to the node. If will not disappear in several minutes node is probably dead.

Node Hardware State

- Occasional yellow - Ok if not for the whole farm.
- Permanent red - System/HW problem (Disk is full etc.)

For color map check Level3 Display Help menu.

L3 Partition Monitor of L3 Display

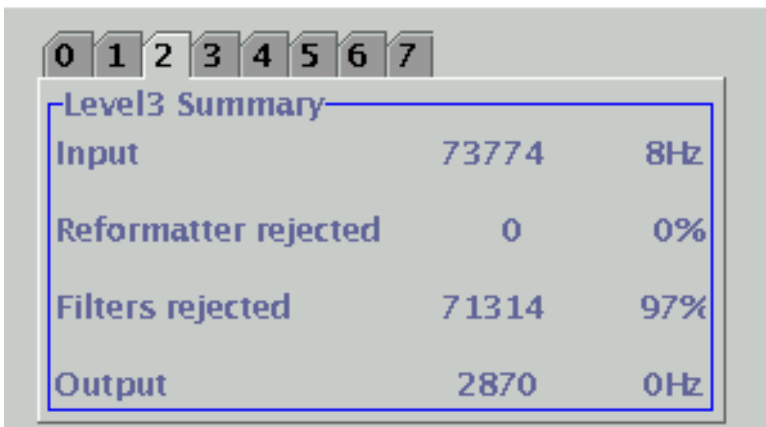
	State/Transition	Phase #/out of #	Time spent
Partition 0:	In transition: End	Collect EoR summary: 2/3	00:00:13
Partition 1:	Not defined	In state: 1/1	00:00:13
Partition 2:	Not defined	In state: 1/1	00:00:13
Partition 3:	Not defined	In state: 1/1	00:00:13
Partition 4:	Not defined	In state: 1/1	00:00:13
Partition 5:	Not defined	In state: 1/1	00:00:13
Partition 6:	Not defined	In state: 1/1	00:00:13
Partition 7:	Not defined	In state: 1/1	00:00:13

Shows hardware partitions states and transitions.

Things worth to check

- How many hardware partitions are running with Level3.
- Bar **State/Transition** is yellow - Level3 received the RC transition message shown in the box.
- Field **Time spent** is more than 5 min - Failure.
- All bars are red - Level3 Proxy is dead or L3 display lost connection. Check L3 Proxy from Ace Control Panel. Restart L3 Display or L3 Proxy depending on result.

Level3 Summary



The screenshot shows a software window titled "Level3 Summary" with a tabbed interface at the top containing tabs numbered 0 through 7. The active tab displays a table with the following data:

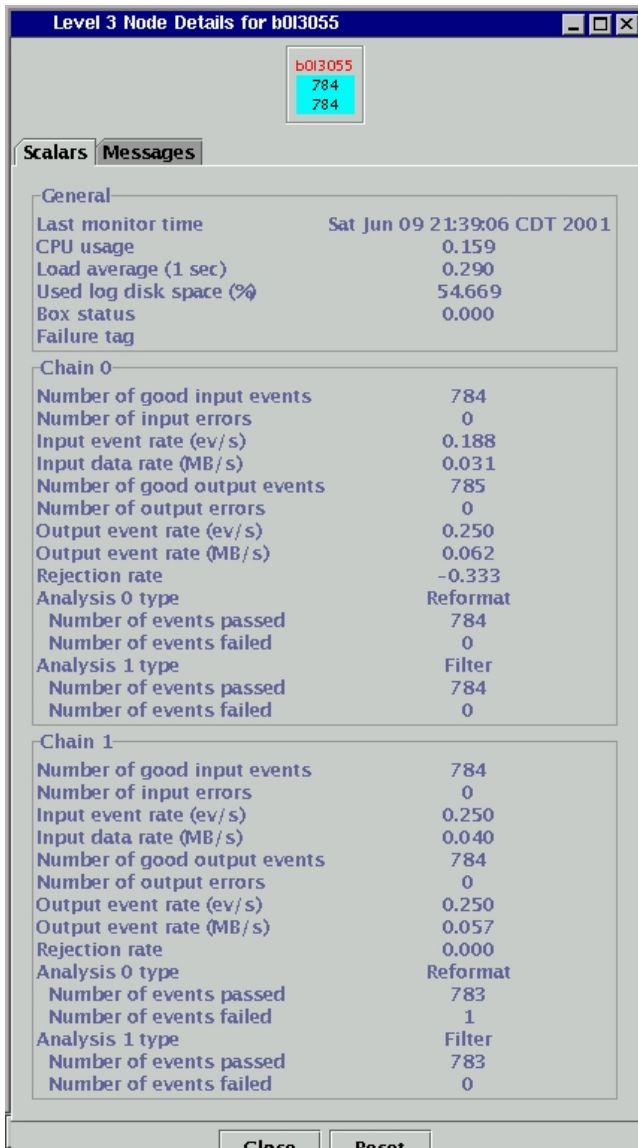
Level3 Summary		
Input	73774	8Hz
Reformatter rejected	0	0%
Filters rejected	71314	97%
Output	2870	0Hz

Shows input output and rejection rates/events.

Things worth to check

- Input count and rate. Compare with RC number.
- Reformatter rejection count and rate. If more than 1%,- do something. (Failing component?)
- Filter rejection count and rate. If close to 100%,- do something. (Noisy Level1 trigger?)
- Output count and rate. Compare with CSL rates.
- Notice that each Level3 chain send a "Begin Run" event to the output node at the end of ColdStart transition. Run begins with NON ZERO output event counter.

L3 Display: Node details

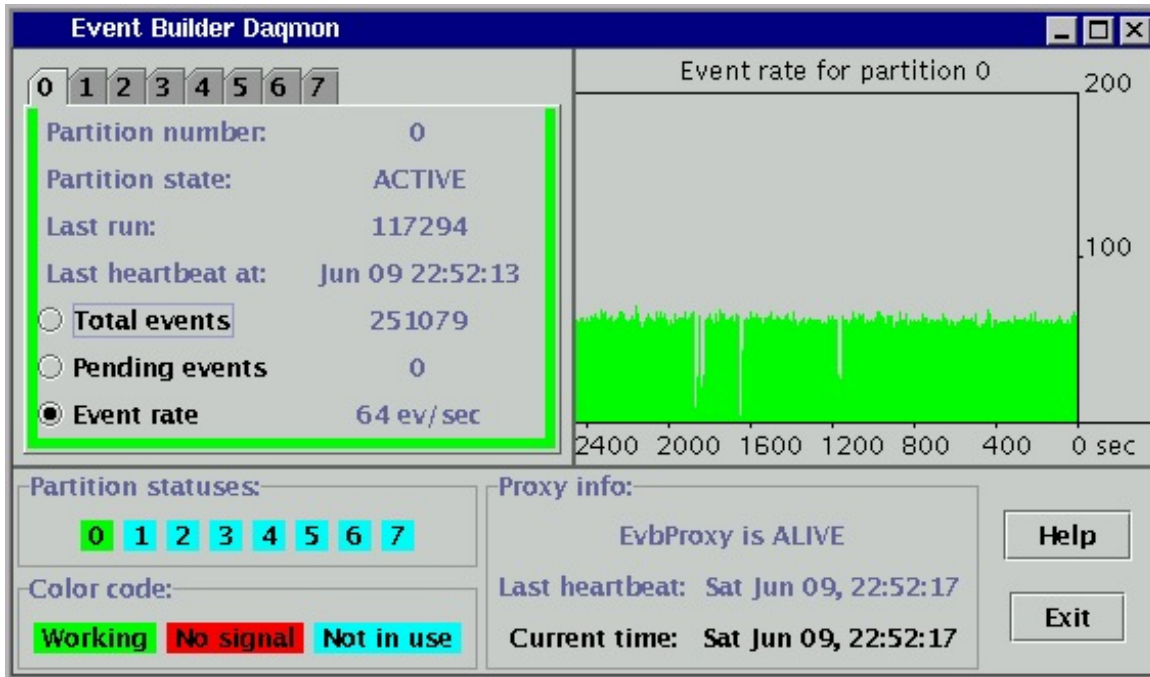


Things worth to check

- Monitoring heartbeat
- Events pass/fail for Reformatter and L3 Filter
- Number of input/output errors. (Esp. for converters)
- Input/Output data/event rate. One can find the size of the event by dividing data rate to event rate.

To open: click on any node of L3 Display

EvbMon



Shows partition states and primary statistics

Things worth to check

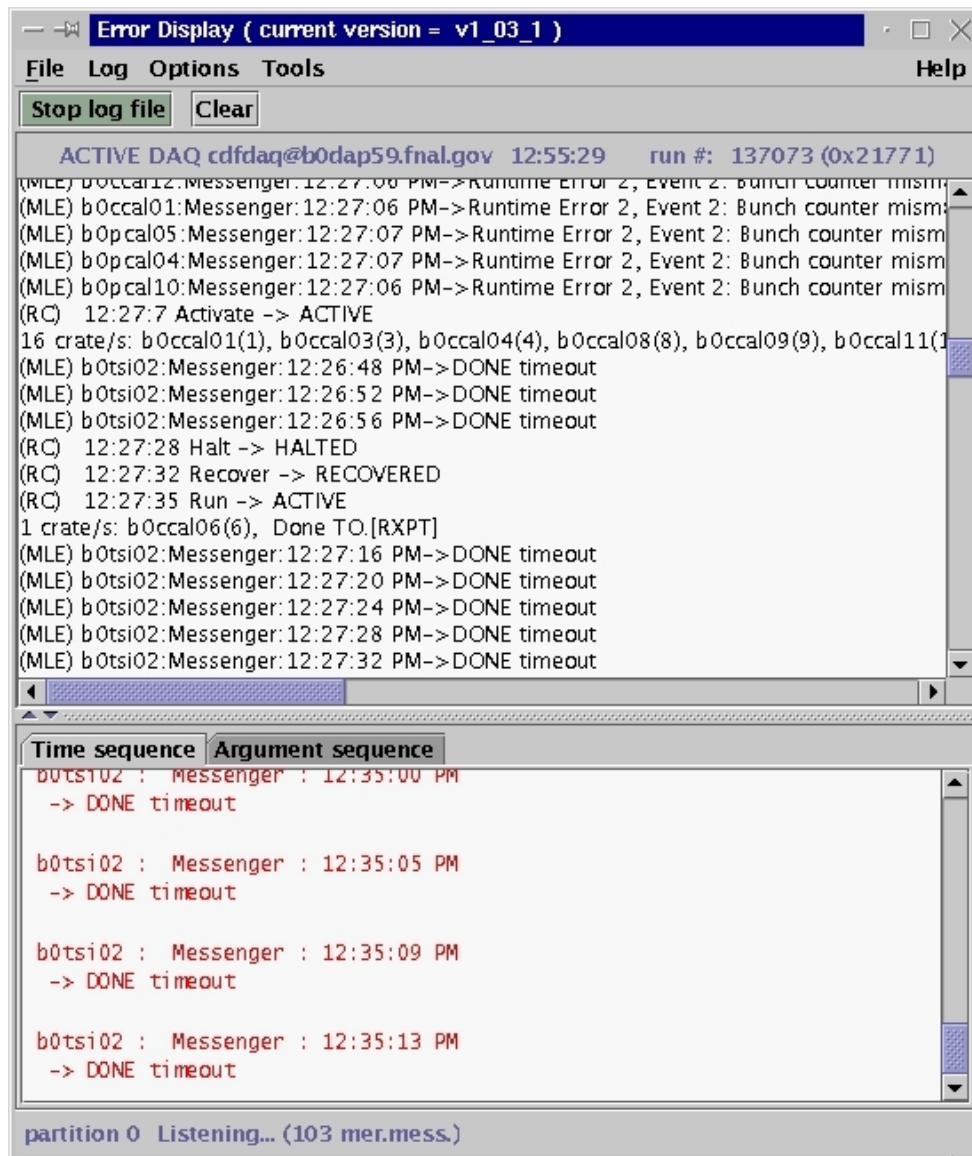
- Pending events indicate problems up/down stream
- EvbProxy is alive/dead
- Event rate
- Monitoring heartbeat

EVB/L3 errors and recovery

Run-time errors

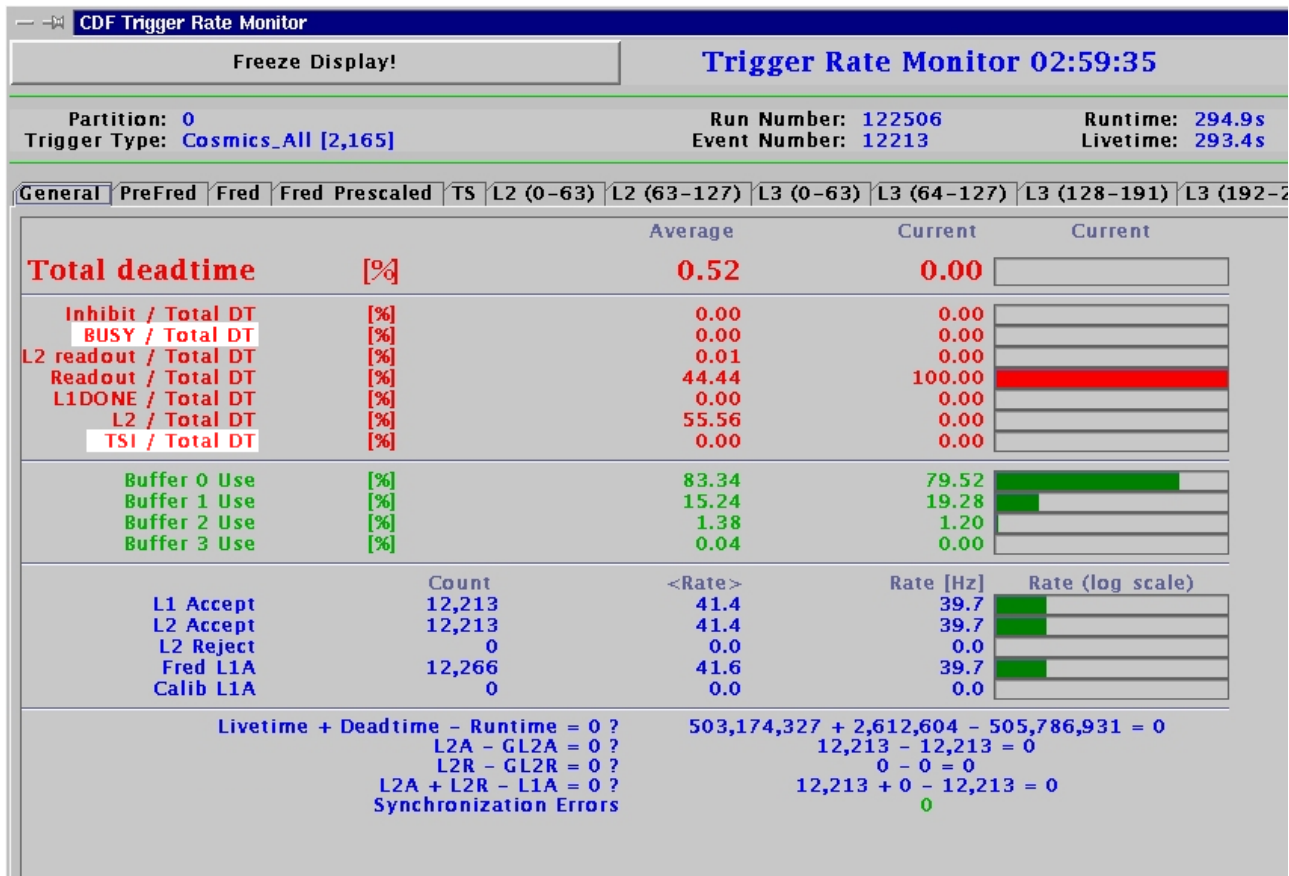
- Deadtime.
- DONE timeout.
- BUSY timeout.
- Dealing with Reformatter Errors.
- Things worth to keep eye on.

Error Logger



Whenever in troubles check RC Error Logger.

Deadtime Monitor



Inhibit High voltage inhibit. Check HV monitor.

Busy: - VRB is full. Check EvbMon for pending events. Cleanup EVB if needed.

L2 readout: Problem between L2 decision crate and Trigger Supervisor. Reboot b0tsi00. Page TSI expert.

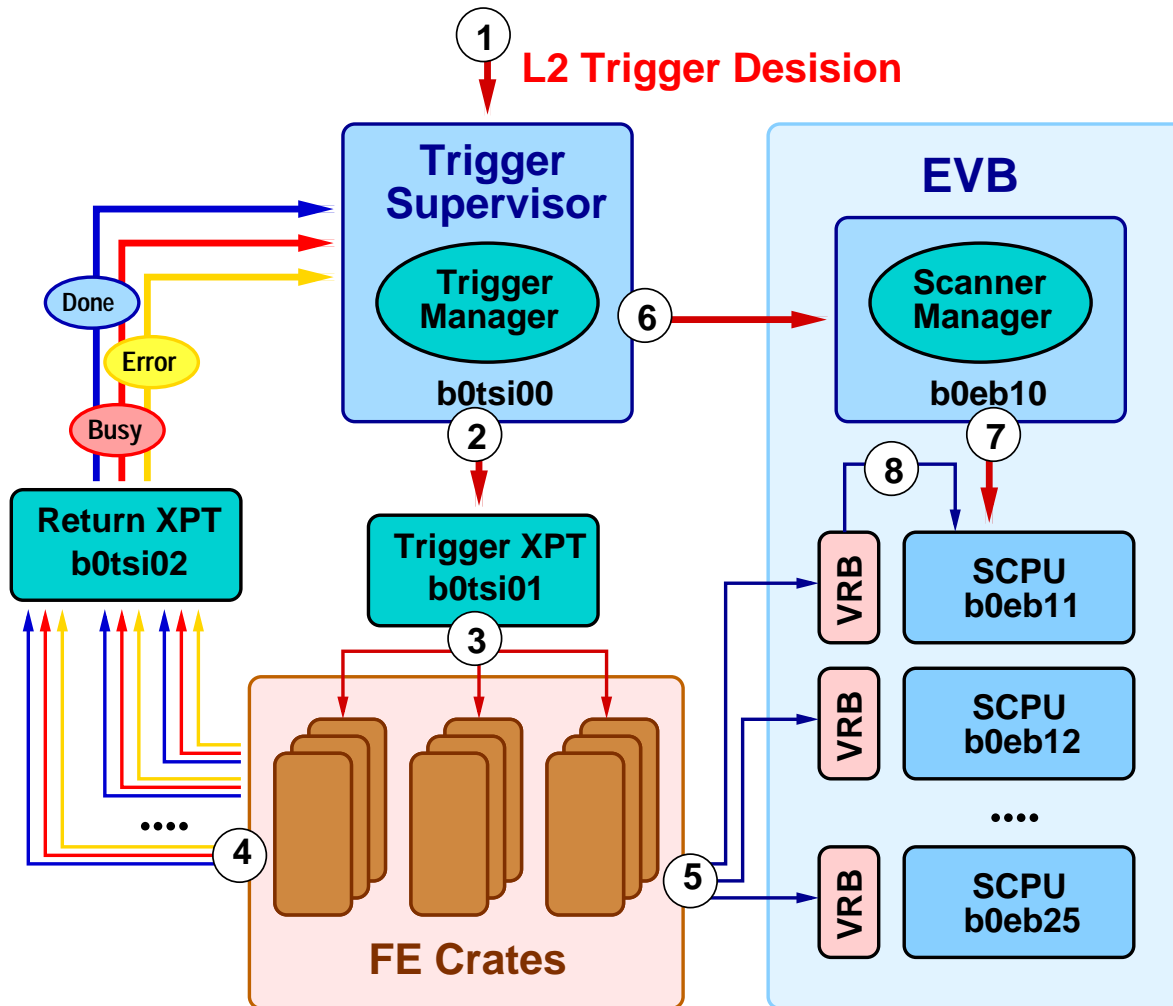
Readout: The time between FE crate receiving L2 trigger and set DONE signal is too long. Reboot the FE crate which cause the deadtime. Page expert.

L1DONE: Silicon trigger problem. Page silicon.

L2: Alpha board problem. Not enough processor power. Reboot Alpha board. Remove b0l2dec00 from run. Page L2 expert.

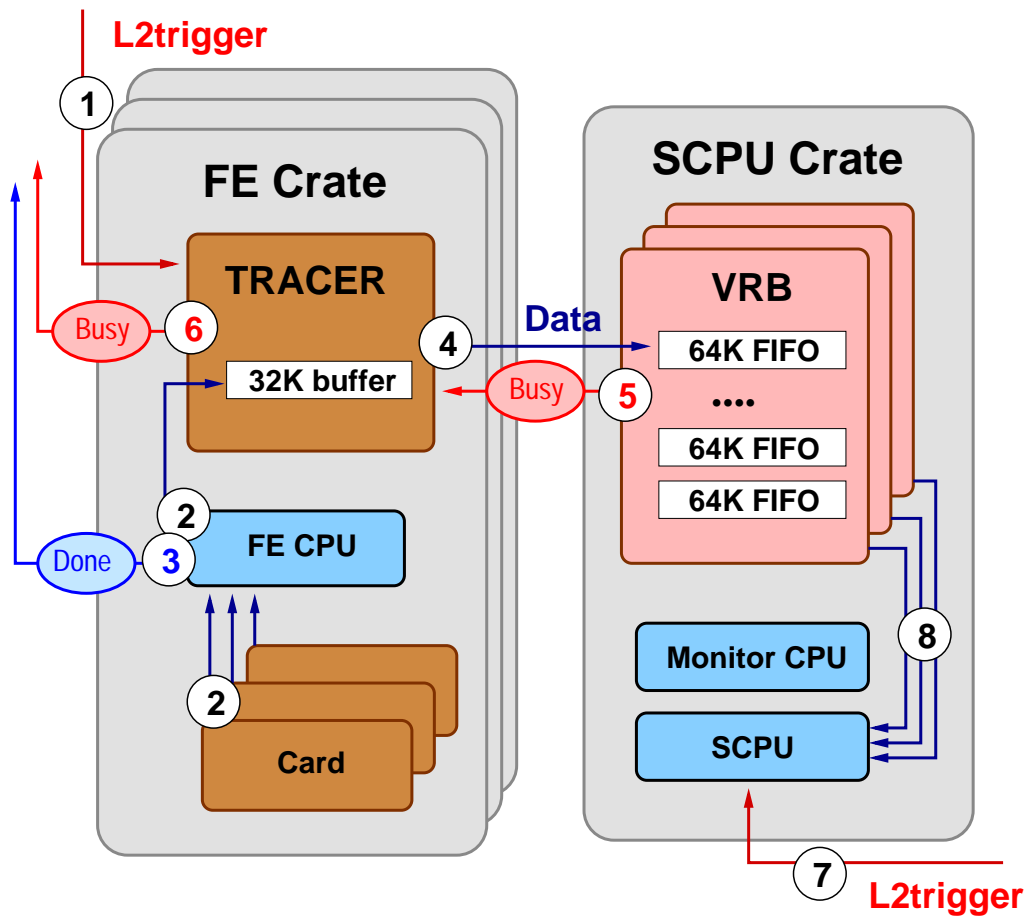
TSI: - Interval0 (RC settings) is too big. EVB is too slow. Check EvbMon for pending events. Cleanup EVB if needed.

Trigger



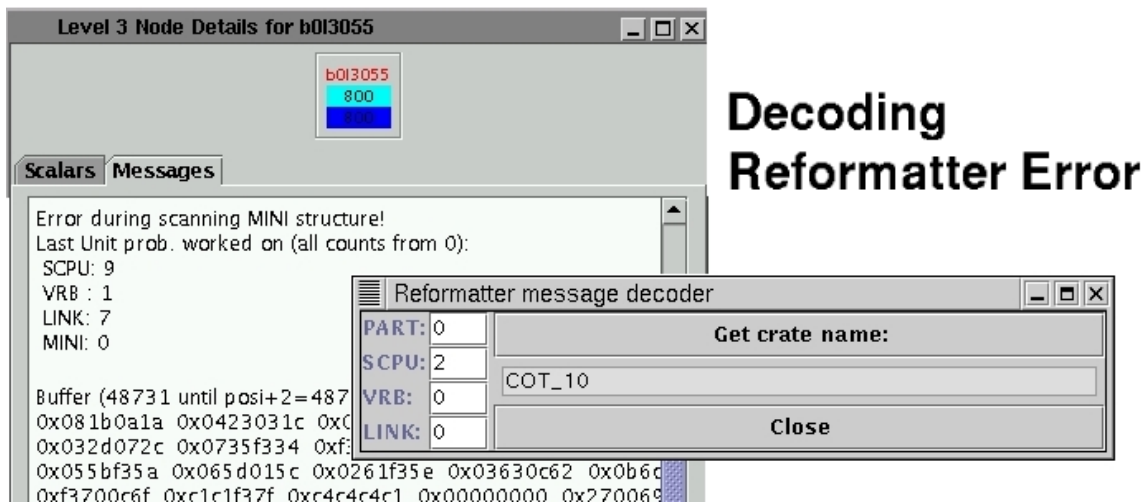
1. Trigger comes from Level2 to Trigger Supervisor (TS)
2. TS passes it to Trigger Cross Point
3. Cross Point fans it out to FE crates
4. FE crates load event and send DONE to Return XPT
5. FE crates start loading data to VRBs
6. TS send trigger to SM after getting all DONEs from FE
7. SM notifies SCPU about trigger
8. SCPU load data from VRBs and wait for further instructions from SM

Timeouts



1. Trigger comes to Tracer from Trigger Cross Point
2. Cards load data to Tracer Buffer.
3. FE CPU sets DONE signal if everything is ok. If DONE signal is not set Return XPT send DONE timeout to TS
4. Tracer sends Data to VRB FIFO
5. If FIFO is full VRB sends BUSY signal to Tracer
6. Tracer sends BUSY signal to Return XPT
7. If everything is ok SM notifies SCPU about trigger
8. SCPU load data from VRBs

Dealing with Reformatter Errors.



Decoding Reformatter Error

Find relevant FE component with a tool started by green button on Ace Control Panel.

- You should be in Active or Idle state to use the tool.
- If you can not start the tool restart Ace Control Panel.
- **Server is not found** popup - try again, page Level3.
- **Link is not in use** popup - Corrupted data can not provide us with correct link number. Change link number to 0 and try again.

The reformatter rejection rate could be found at L3 rate monitor (part of L3 Display).

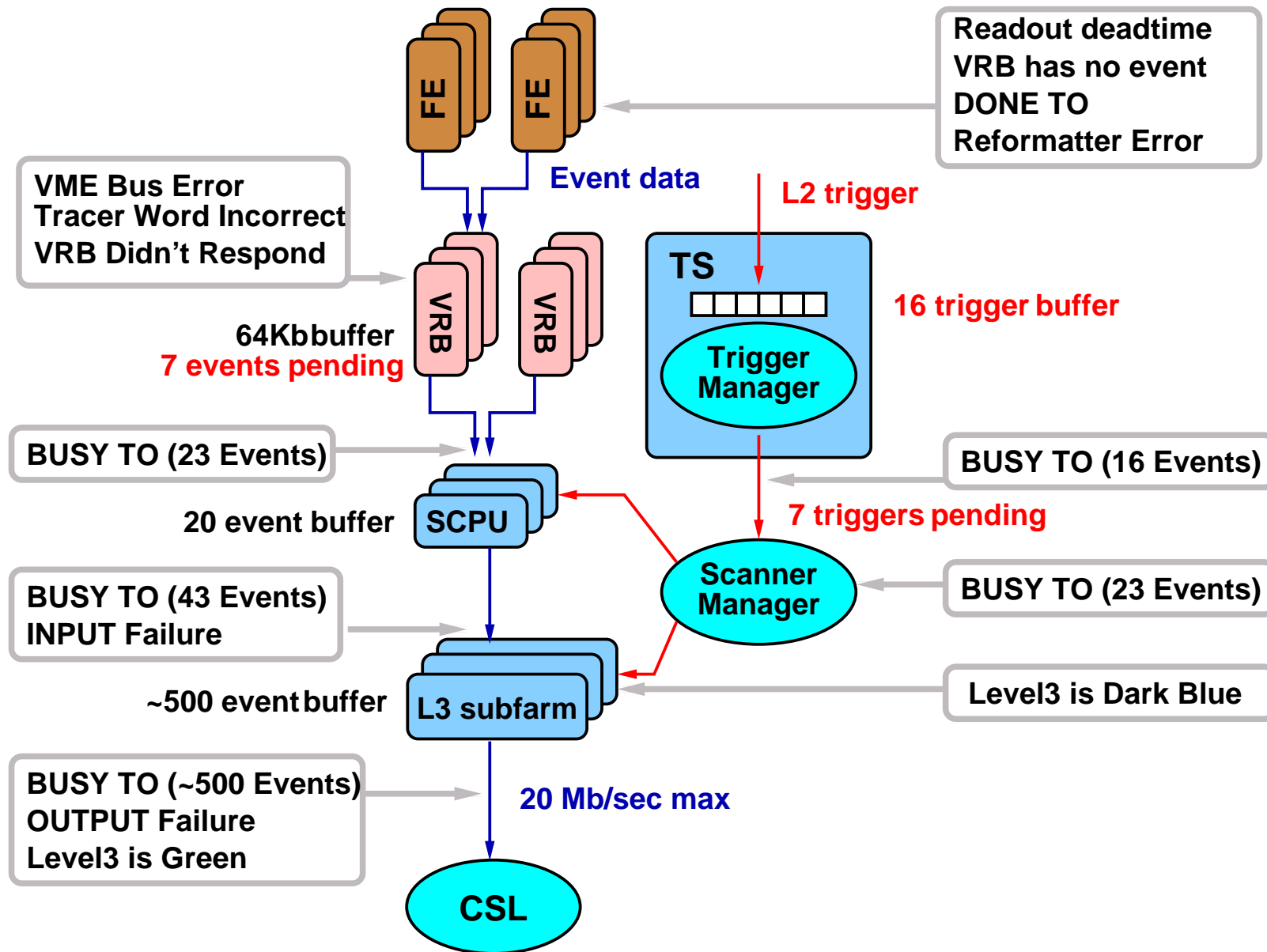
It gives the average reformatter rejection over the run

A new monitoring tool called RefMon is also running.

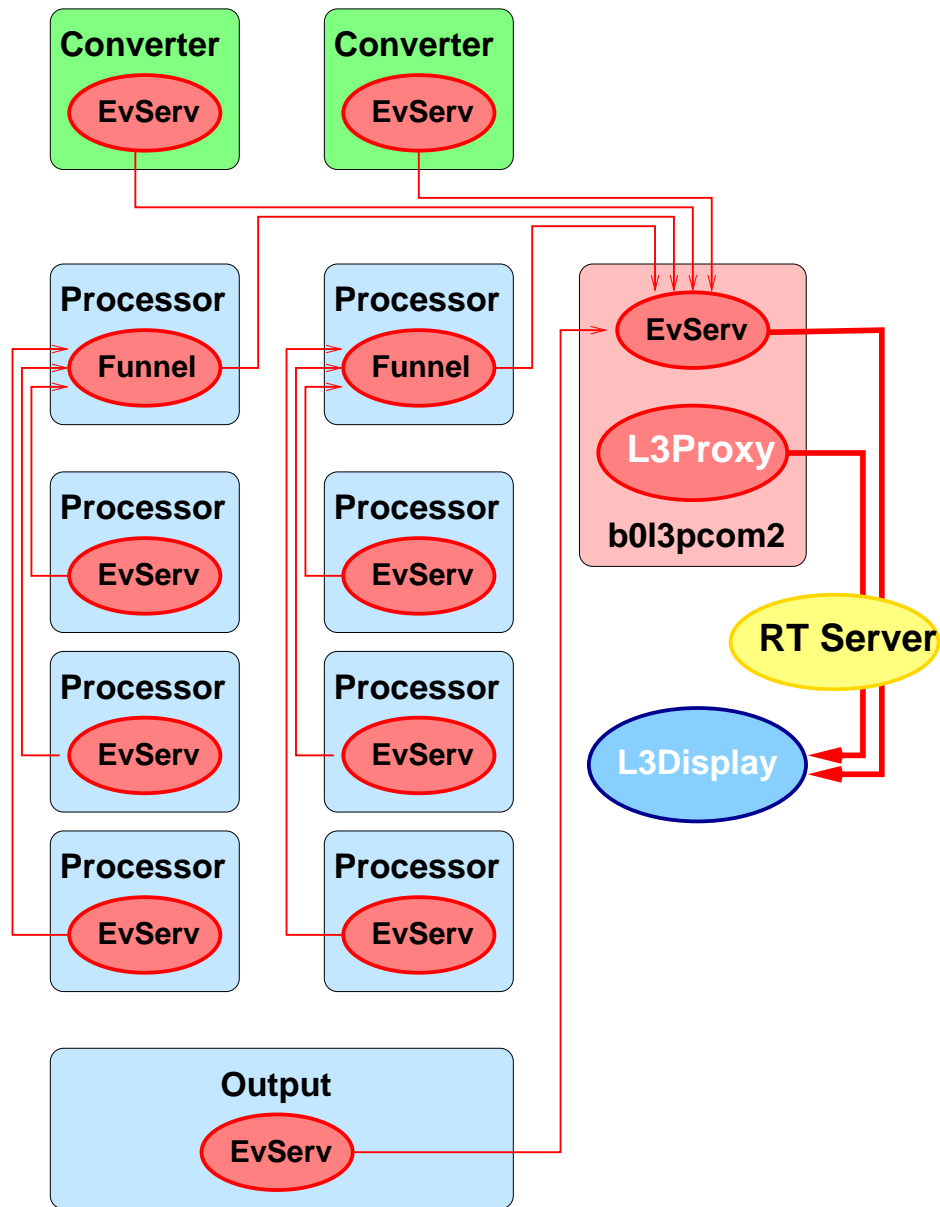
RefMon calculates the rejection rates over the last 30 seconds. If rejection exceeds some predefined level (currently 1 %) RC pops up an orange window with instructions for the Aces

Check L3 Rate Monitor for reformatter error rate.

Networks, Buffers, Data Flow, Errors.

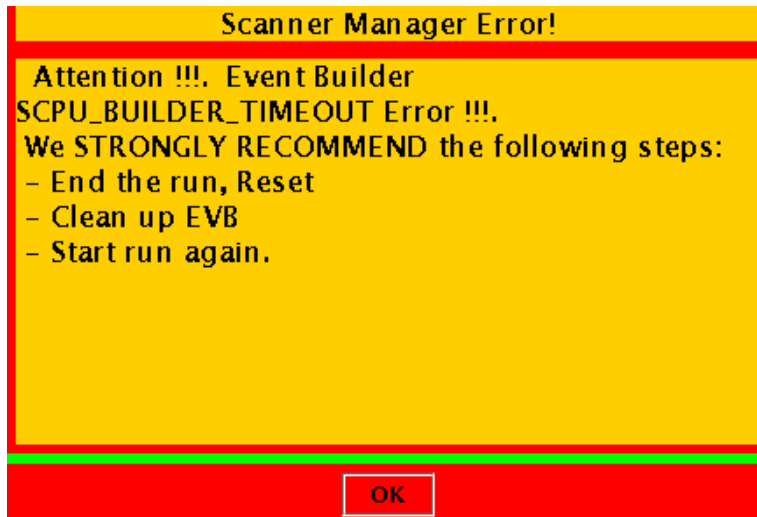


Level3 monitoring data flow



- Eventserv - Accepts and sends monitoring messages.
- Event Funnel - L3 wrap for Eventserv. Accumulate monitoring messages. Sends them in 4 second intervals.

General Remarks



- If you get an orange popup window with EVB/Level3 problem follow the instructions.
- Check RC Error Display for error messages.
- Any transition can not take more than 5 minutes. If it takes more it means a problem.
- **DONE timeout** (Readout deadtime). - Problem with FE.
- **BUSY timeout** (Busy deadtime). - Problem with TS or EVB or *Down the stream*. (check Magic Numbers).
- You have to be in START state when cleaning up EVB and Level3 or restarting Proxies.
- If you abnormally closed the partition without Reset you have to cleanup EVB.

Things to Keep an Eye on

- L3 Display Color.
 - Gold (Old) - Monitoring problem. Restart L3Display.
 - Dark Blue (Busy State) - not enough process power. Add subfarms
 - Green (Output State)- problem is downstream. Check CSL rates and message queues. 20Mb/sec is max output capacity
- Check if CSL gets events at all.
- Check Rates and Dead time.
- Check Reformatter rejection rate.
- Look if Level3 proxy is alive on L3 Display.
- Look if EVB proxy is alive on EVB monitor.

Support.

Quick Help.

DONE Timeout BUSY Timeout

Deadtime (ALL) BUSY Deadtime

EVB

Level3

·EvbMon

·L3 Display
(**COLORS**)

·EVB Errors
(**RC Error Display**)

·Level3 Errors
(**RC Errors Display**)

·Reformatter Errors

·EVB Failed Transition

·Level3 Failed Transition

·Cleanup EVB

·Cleanup Level3

Monitoring Tools

Glossary.

Manual. (PostScript 20Mb)

Featured Articles.

Boris Ivutin

See CDF Note 5793.

Expert list

- **Arkadii Bolshov** (pager)
- **Nuno Leonardo** (pager)
- Ilya Kravchenko (cell)

Phone/Pager Numbers are posted in the Control Room and on ace web page.

CSL overview for ACEs

Ben Kilminster, Kevin McFarland, Tony Vaiciulis
University of Rochester

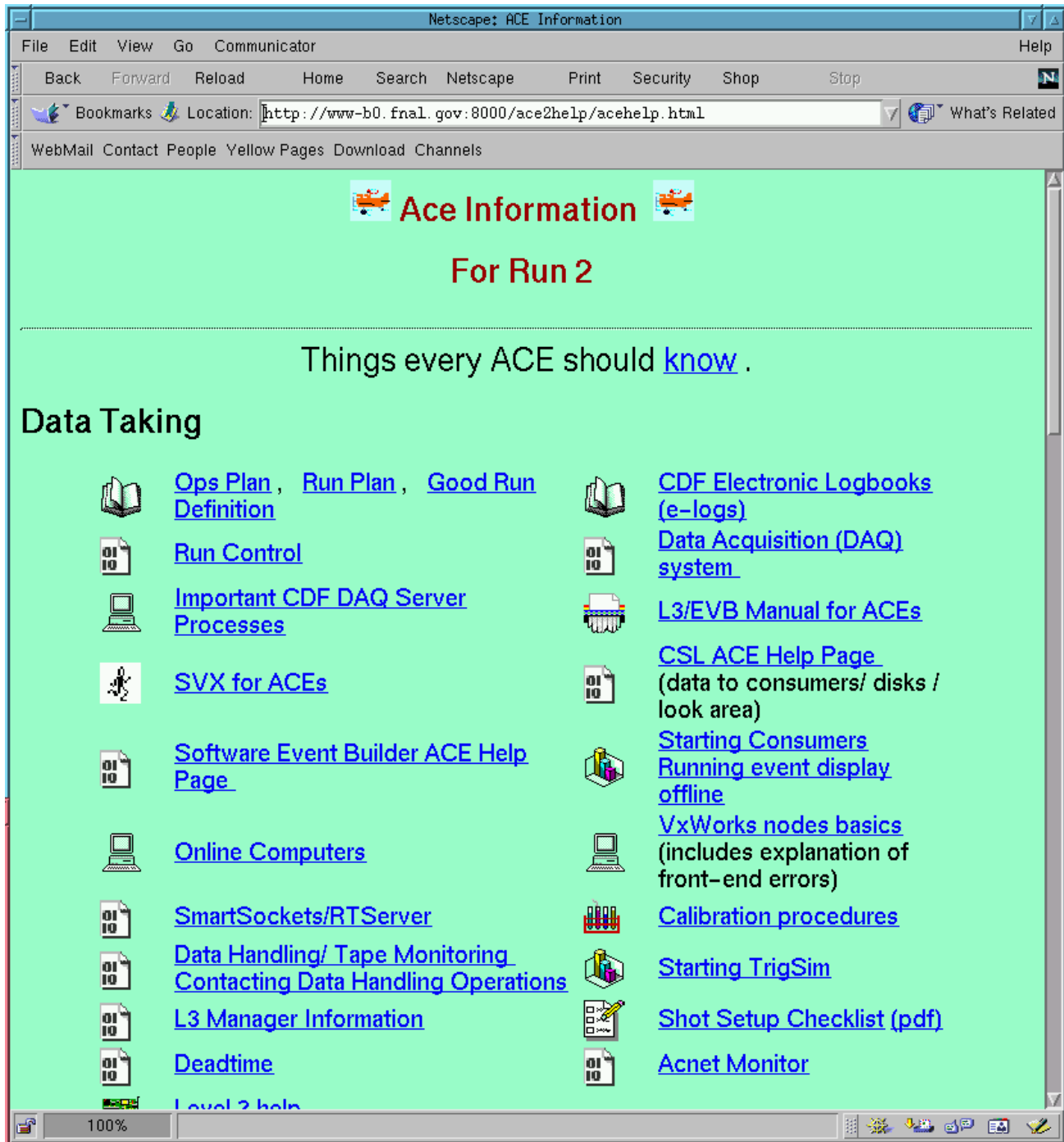
Hirokazu Kobayashi, Hiroyuki Matsunaga, Makoto Shimojima
University of Tsukuba

January 16, 2002

- CSL description
- monitoring
- troubleshooting

CSL ACE Help Page

Most items in this talk are documented on CSL ACE help page



CSL ACE Help Page

Netscape: Consumer-Server/Logger ACE Help Page

File Edit View Go Communicator Help

Back Forward Reload Home Search Netscape Print Security Shop Stop

Bookmarks Location: <http://www-b0.fnal.gov:8000/ace2help/csl/> What's Related

WebMail Contact People Yellow Pages Download Channels

Consumer-Server/Logger ACE Help Page

About the CSL

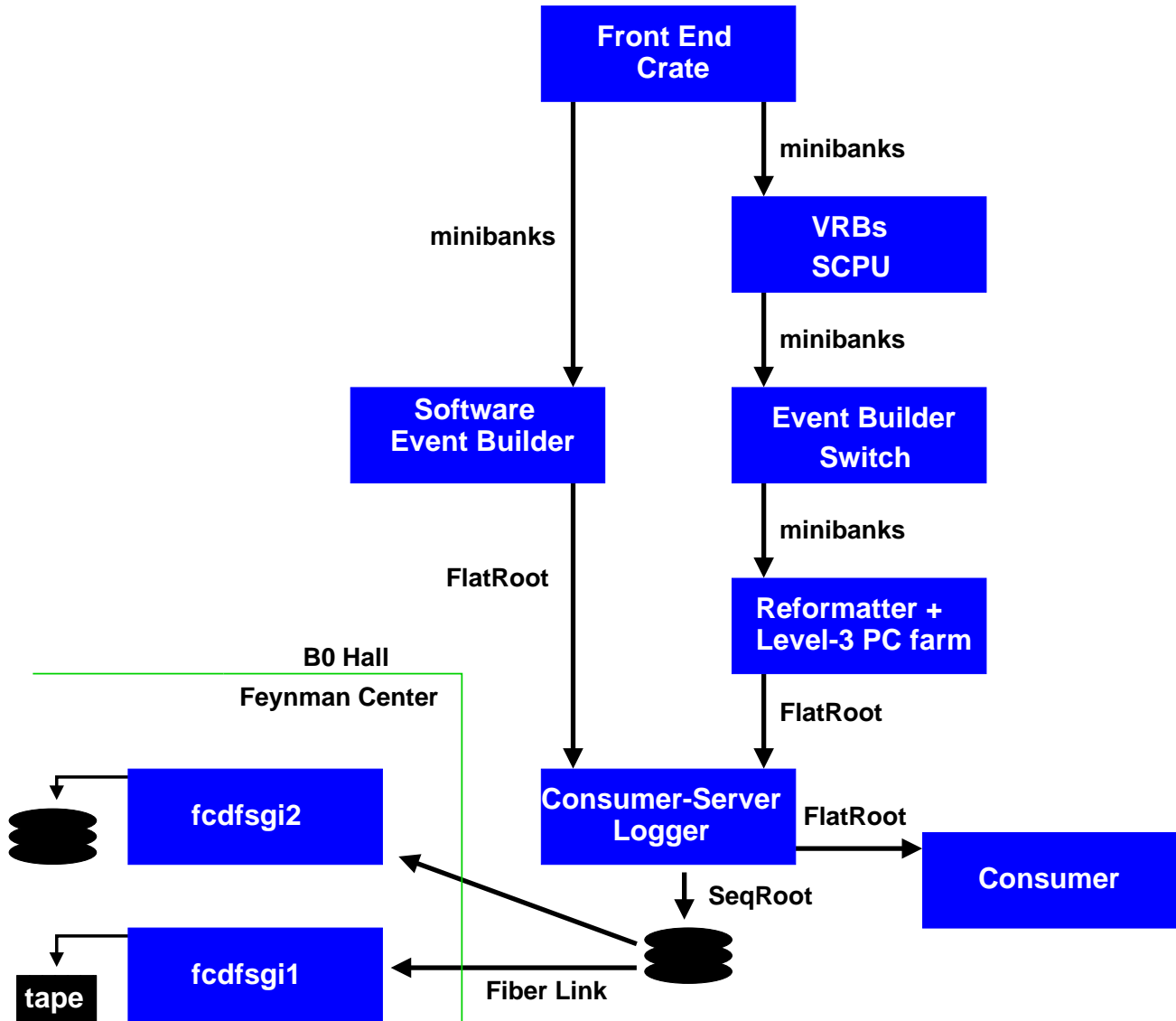
Questions, comments, suggestions? Send mail to cdf_csl@fnal.gov

The Consumer-Server/Logger (CSL) is the central online hub through which all CDF data taken during Run II must pass. Events passing the Level-3 trigger are written to disk and served to consumers by the CSL. The raw data files on disk are then moved to the Feynman Computing Center (FCC) for further processing. Consumers are online monitoring processes, spying on a fraction of the data passing through the CSL. The diagram below shows how the CSL fits into the overall dataflow.

```
graph TD;
    FEC[Front End Crate] -- minibanks --> SEB[Software Event Builder];
    FEC -- minibanks --> VRB[VRBs SCPU];
    VRB -- minibanks --> EBS[Event Builder Switch];
    EBS -- minibanks --> RLF[Reformatter + Level-3 PC farm];
    SEB -- FlatRoot --> B0H[B0 Hall];
    RLF -- FlatRoot --> B0H;
    B0H --- FC[Feynman Center];
```

The diagram illustrates the dataflow of the Consumer-Server/Logger (CSL). It shows the path from the Front End Crate through various processing stages to the B0 Hall and Feynman Center. The Front End Crate sends data via minibanks to both the Software Event Builder and the VRBs SCPU. The VRBs SCPU sends data via minibanks to the Event Builder Switch, which then sends data via minibanks to the Reformatter + Level-3 PC farm. Both the Software Event Builder and the Reformatter + Level-3 PC farm send data via FlatRoot to the B0 Hall, which is connected to the Feynman Center.

CSL description



primary CSL functions

- receive events from Level-3 PC farm at 20 MB/sec ($75 \text{ Hz} \times 250 \text{ kB/event}$)
- receive events from the software event builder
- write events to disk at $\sim 20 \text{ MB/sec}$
- handle as many consumer requests as possible (5-10 MB/s total)

Starting/stopping the CSL

During normal running, the CSL never needs to be started or stopped. It is always "on", ready to receive events.

The ace is able to start or stop the CSL processes.

The following commands are available:

b0dau32: cslcom stop (stop all CSL processes)

b0dau32: cslcom check (check if CSL processes are running)

b0dau32: cslcom start (start all CSL processes)

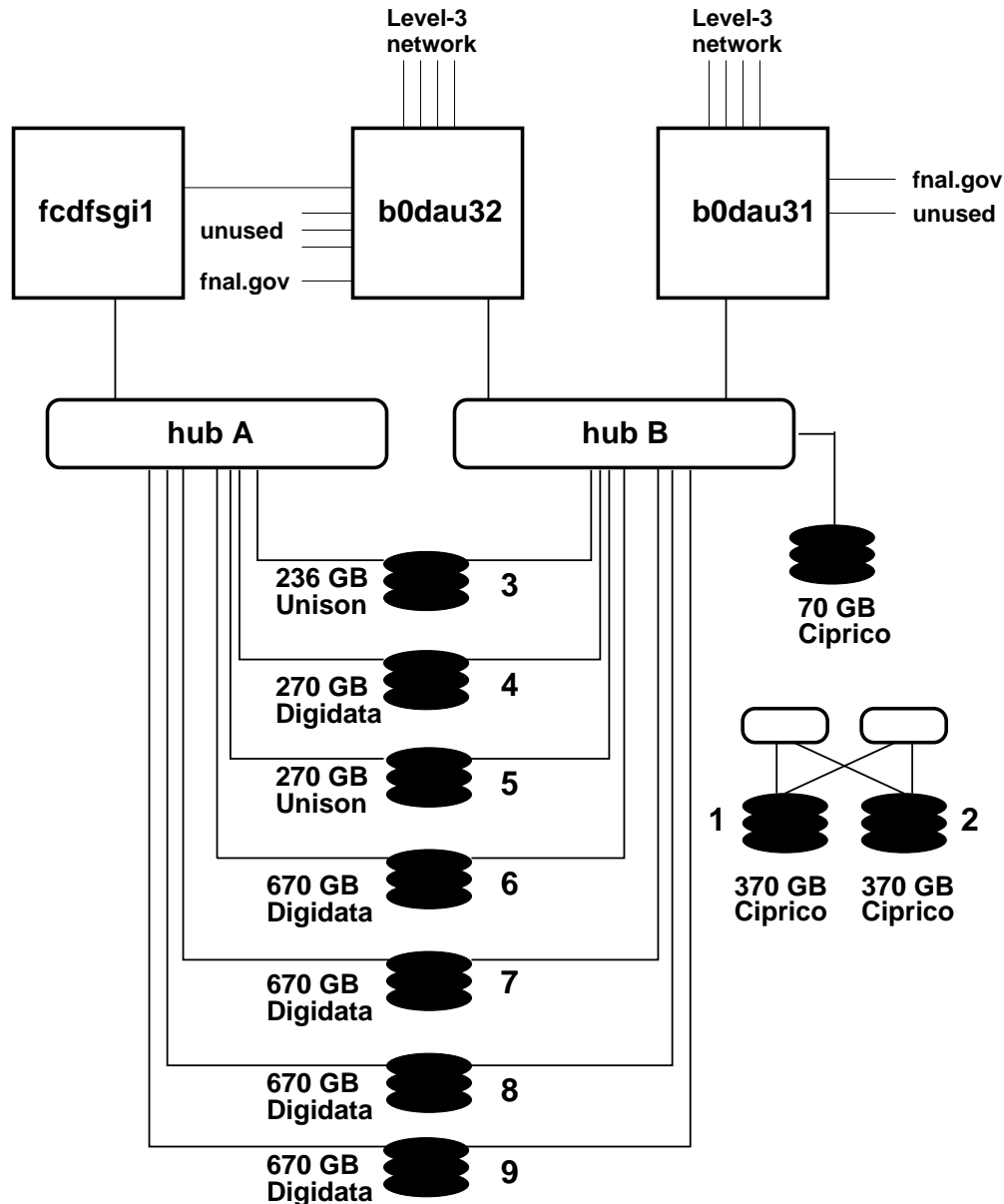
b0dau32: cslcom cleanup (kill all CSL processes, normally you don't need to do this)

Whenever start, stop, or cleanup are executed mail is automatically sent to the CSL group. Shift crew should also send a mail to

`cdf_csl@fnal.gov`

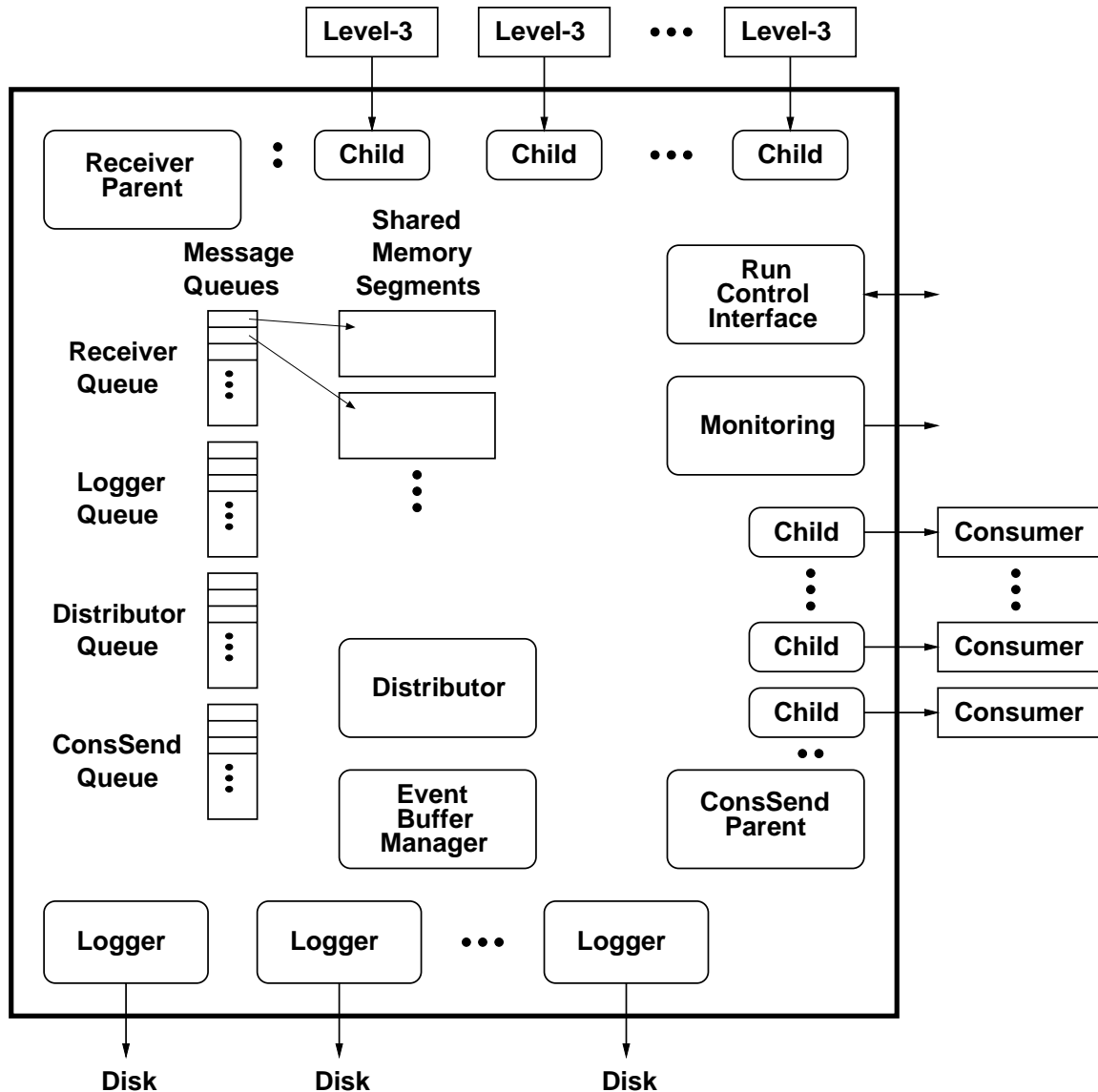
describing why the CSL was restarted.

CSL hardware overview



- b0dau32, an SGI 2200 Server (4 CPUs, large I/O bandwidth) located on third floor of B0
- ~3.5 TB of disk space on third floor of B0 (7 RAIDs)
- dual ported disks allow both fcdfsgi1 in FCC and b0dau32 to access disks

CSL software: overview



The CSL is a “server”. Possible “clients” include

- Level-3 output node processes
- software event builder processes
- 24 hour sender in partition 14
- consumers

Events are stored in shared memory buffers. Flow of events between processes inside CSL achieved by means of message queues.

CSL software: monitoring

The monitoring process collects CSL status information and sends it via a smartsockets message to the CSL monitoring display.

There are two kinds of CSL monitoring:

- the CSL display (snapshot of current CSL state)
- the CSL history plots (show rates, disk space, events logged, etc. versus time)

Using CSL display to check current CSL status:

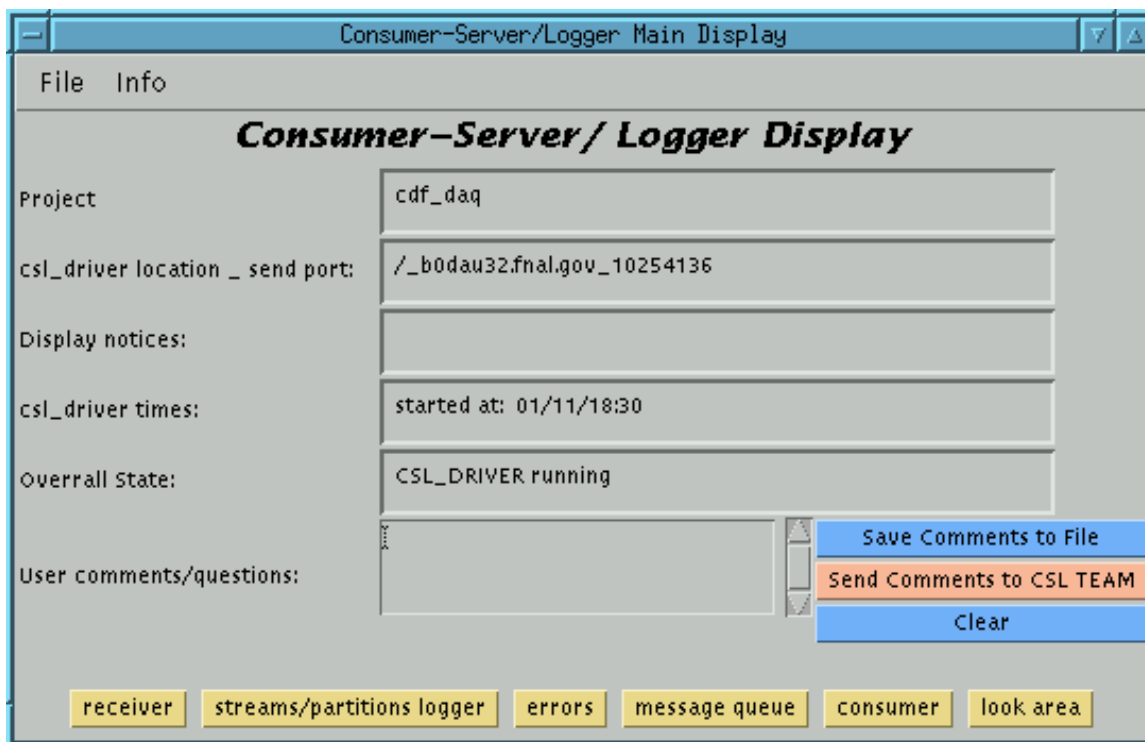
login to machine on online cluster

setup fer

daqmon

A GUI should appear on your screen. Click on CSL button.

Use project name cdfdaq (this should be the default). The CSL monitor main display window should appear.



CSL software: receiving

RECEIVER DISPLAY OF EVENTS COMING INTO CSL											
File		Info									
Events From			Statistics		Status						
Client Name	Partit.	Port #	Inst Rate	Event count	Event size	Activity rate	Unconn	Conn	Idle	Active	
b0dap60.fnal.gov	14	1435	0.235	949	0.297	0.0833					
b0l3u02c	0	4022	1.3121	242	0.3403	0.0833					
b0l3u01c	0	3023	1.3148	236	0.341	0.0667					
b0l3u07d	0	3523	1.2062	233	0.3297	0.0667					
b0l3u06c	0	4540	1.3542	207	0.334	0.05					
b0l3u04d	0	3452	1.4315	221	0.3367	0.05					
b0l3u08d	0	2361	1.2629	220	0.3452	0.0333					
b0l3u05c	0	4349	1.3569	222	0.3347	0.0833					
b0l3u03d	0	4097	1.2023	232	0.3474	0.0167					
Total (MB/s)		10.6759	Receivers ending in error			440					
Events Received from current clients		2762	Show average rate								
Events Received from all clients		0	Show current rate								

For each client sending events to the CSL, there is a receiver process.

The CSL monitoring GUI displays information for each receiver process: client node name, partition, number of events received, and rate.

CSL software: logging

The screenshot shows a window titled "rates for logger streams and partitions". It contains a table with columns for "Part 0" through "Part 15" and rows for "Run Number", "stream A" through "stream J", and "Part totals". The "Run Number" row shows values for each partition, with Part 0 being 136395 and others being 0. The "stream" rows show values for each stream, with stream A being 49, stream B being 2178, stream G being 491, and stream J being 532, while others are 0. The "Part totals" row shows a total of 3250 for Part 0 and 0 for all other partitions. At the bottom, there are buttons for "Show peak rate", "Show average rate", "Show current rate", "Show number of events", and "Show event rate".

	Part 0	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10	Part 11	Part 12	Part 13	Part 14	Part 15
Run Number	136395	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0	0.000000
stream A	49	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0	0.000000
stream B	2178	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0	0.000000
stream C	0	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0	0.000000
stream D	0	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0	0.000000
stream E	0	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0	0.000000
stream F	0	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0	0.000000
stream G	491	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0	0.000000
stream H	0	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0	0.000000
stream I	0	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0	0.000000
stream J	532	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0	0.000000
Part totals	3250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total				3250												
Overall Logging counter																

This display is one way to check whether events are being written to disk.

For each partition and each stream this display shows

- the number of events written to disk OR
- the rate of writing events to disk in MB/sec

Modes of running: 4 stream (A,B,G,J), inclusive (only stream I), 8 stream (A,B,C,D,E,G,H,J)

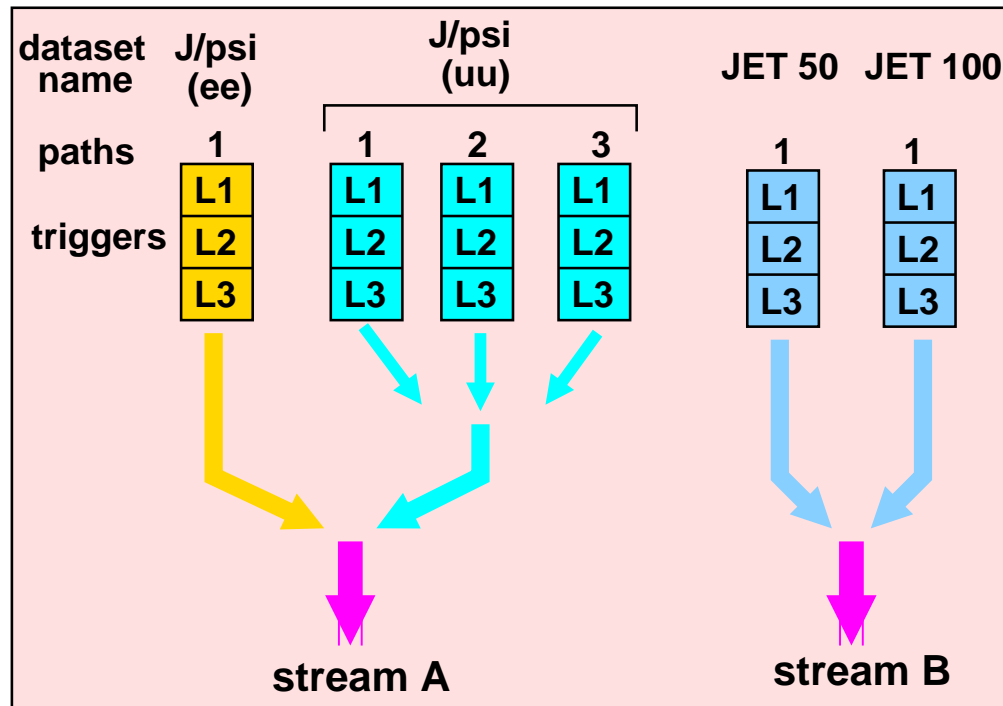
CSL writes events into 1 GB output files onto disks.

CSL disks are temporary holding space for events.

After closing, file sent to FCC where fcdfsi1 puts it onto tape. Should be enough disk space for an 8 hour buffer.

First 1 or 2 files of each run go to “look” area on fcdfsi2.

Paths, datasets, streams in Run 2



path: AND of Level-1, Level-2, Level-3 triggers.

dataset: OR of all paths defined for that dataset.

stream: collection of datasets

Events coming out of Level-3 are “streamed”: tagged as belonging to a particular stream.

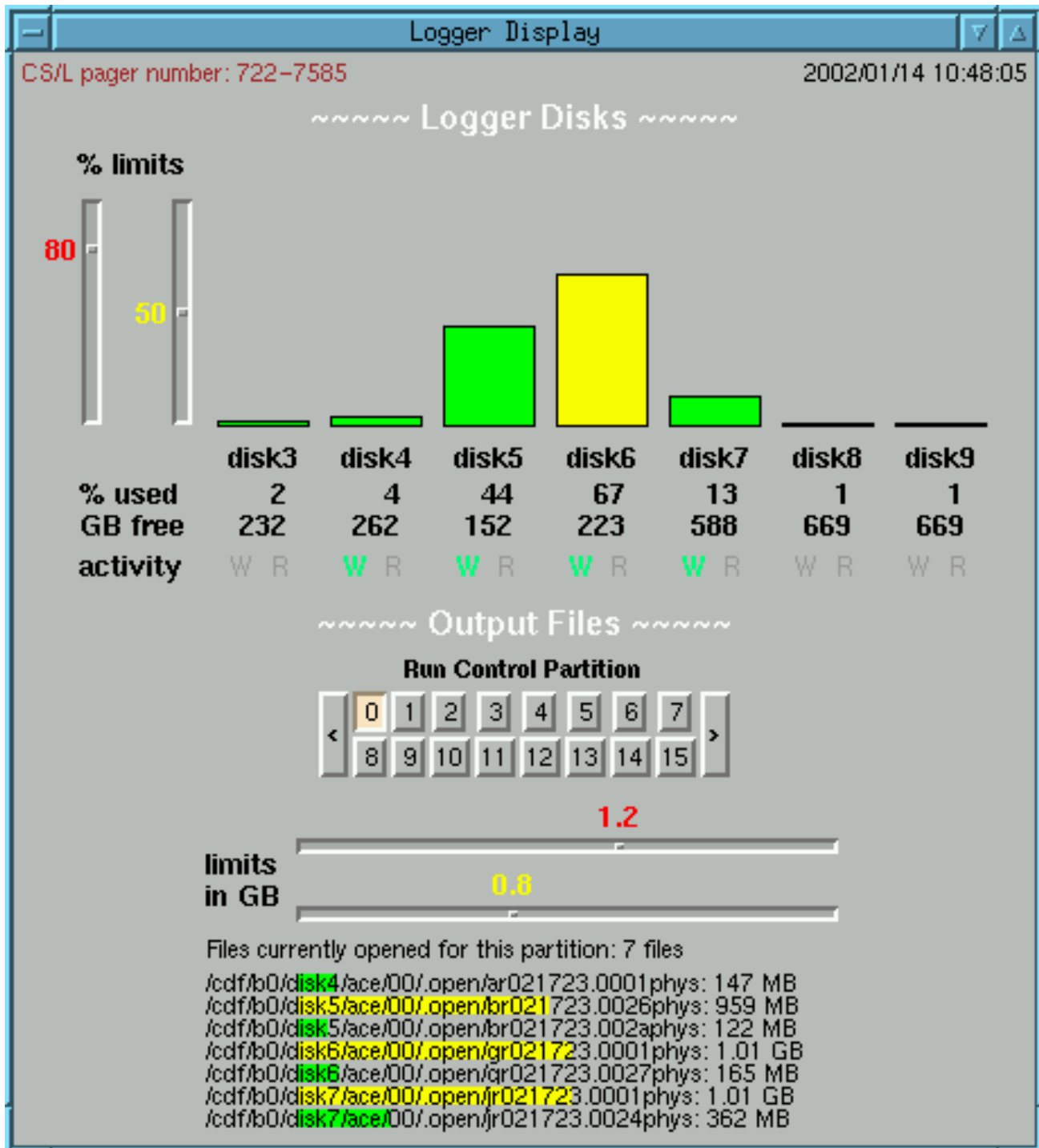
- CDF DAQ system can run in multi-partition mode
- each partition is independent of other partitions
- CSL writes events into separate files for different partitions
- CSL writes events corresponding to different streams within a partition into separate files

Run II: 8 streams, 50-100 datasets

CSL software: serving consumers

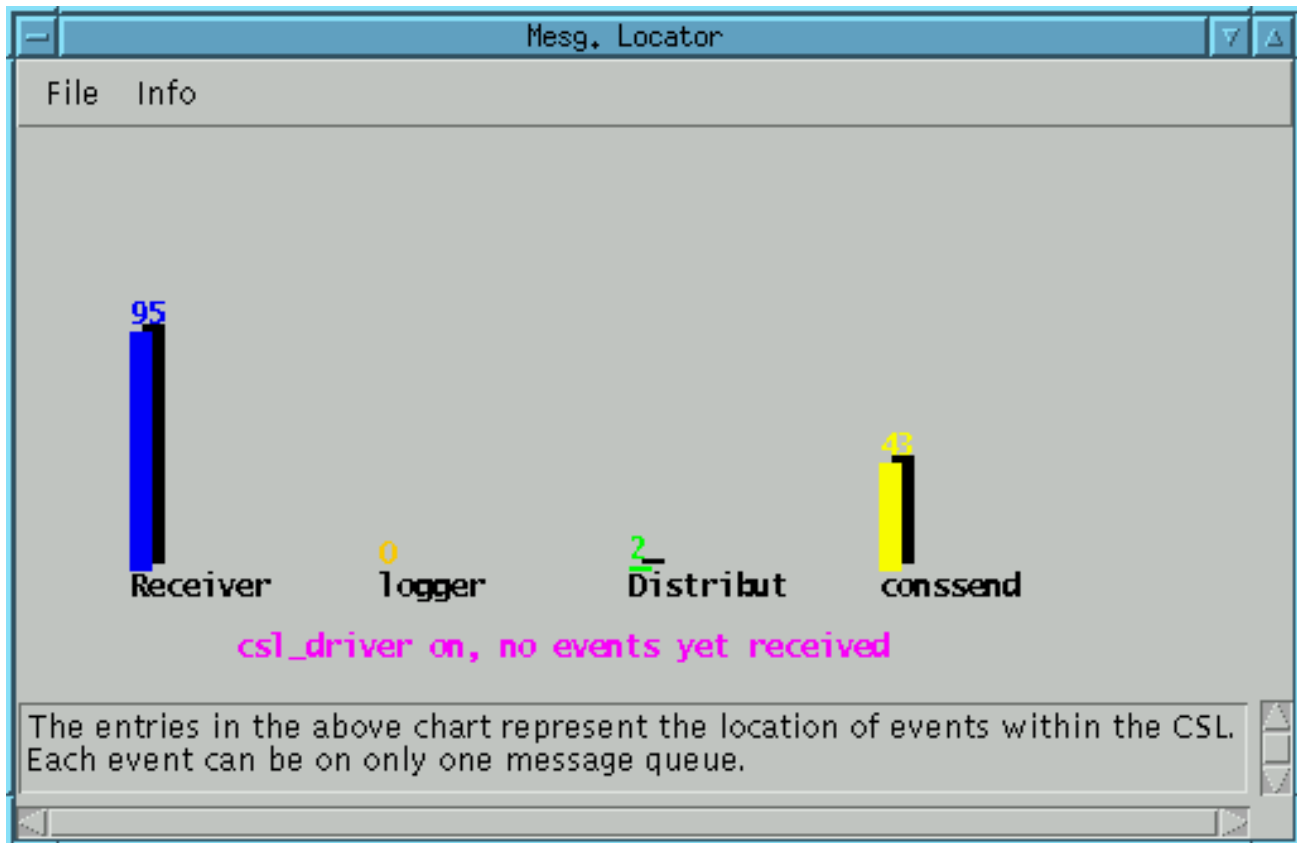
Consumer display														
File Info		Consumer				Statistics					Status			
Cons. Type		Cons. id / part. id	Host name or address	Evs Req.	Events Recvd	Inst Rate	Conn	Waiting	Active	Comple				
DAQMon		28214 / 0	b0dap69.fnal.gov	2502	2501	1.9820185								
Stage0		28212 / 0	b0dap69.fnal.gov	589	589	0.4119289								
SiliMon		25093 / 0	b0dap67.fnal.gov	70	70	0.1095379								
SVXMon		27223 / 0	b0dap66.fnal.gov	138	138	0.1098888								
ObjectMon		20062 / 0	b0dap56.fnal.gov	2005	2005	1.7567364								
BeamMon		27621 / 0	b0dap66.fnal.gov	2449	2448	1.9558252								
LumMon		18337 / 0	b0dap67.fnal.gov	2520	2520	1.992783								
EventDisplay		2429 / 0	b0dap50.fnal.gov	1	1	0								
TrigMon		31169 / 0	b0dap52.fnal.gov	591	591	0.4792719								
XMon		28354 / 0	b0dap70.fnal.gov	544	544	0.4473012								

CSL Monitoring: disks



Shows how full each CSL disk is, name and size of open files for each partition. This is one way to check that data is being written to disk. (Can also use “findfile runnumber” command on b0dau32.)

CSL Monitoring: message queues



There are 150 internal buffers in the CSL. Each buffer can store one event. The display shows four message queues. Each message on a queue points to a buffer where an event may be stored.

Receiver (left, blue) queue shows how many buffers are free to store new events from Level-3. If this is ALWAYS zero and "logger" queue has all the buffers then there is a problem. Contact CSL expert.

CSL history plots

Netscape: Consumer-Server/Logger Home Page

File Edit View Go Communicator Help

Back Forward Reload Home Search Netscape Print Security Shop Stop

Bookmarks Location: <http://www-b0.fnal.gov:8000/~csl/> What's Related

WebMail Contact People Yellow Pages Download Channels

[CSL home page](#)
[presentations](#)
[documentation](#)
[contact people](#)
[monitor plots](#)
[useful links](#)

Consumer-Server/Logger Monitoring Plots

CSL specific plots		
receiver, logger, consumer rates	24 hours	one week
number of events logged	24 hours and one week	
number of processes	24 hours	one week
number of messages in queues	24 hours	one week
average event size (partition 0-3)	24 hours	one week
average event size (partition 4-7)	24 hours	one week
CPU usage: receivers,loggers,consends	24 hours	one week
CPU usage: driver,distributor,bufman,monsend	24 hours	one week
look area	24 hours	one week
general b0dau32 plots		
disk space usage	24 hours	one week
load average	24 hours and one week	
free memory	24 hours and one week	
CPU usage: global	24 hours	one week

[List of files waiting to be copied to the lookarea](#)

[Accelerator Status](#)

Calibration CSL

A special version of the CSL software runs on b0dap60. Useful for some calibration runs which require

- guaranteed delivery of all events to the consumer OR
- a very large event size
(expected Run 2 event size is about 250 kB, official CSL can accept up to 3 MB, calibration CSL can accept up to 17 MB)

Calibration CSL does not log any data to disk.

Data File Catalog

CSL writes information into the Data File Catalog database for each output data file:

- file size
- total number of events in the file
- run number
- first event number in the file
- last event number in the file
- run section numbers

This must be done before the files are put onto tape.

Look Area on fcdsg12

To check status: on b0dau32 as user ace type “lookarea check”

Troubleshooting

Here are some reasons why you might think there is a problem with the CSL

- Level-3 is stuck in a “waiting to output events” state
- The CSL does not acknowledge a run control transition.
- There is an error message from the CSL in the Error Logger.
- You believe Level-3 or the software event builder is sending events to the CSL and one or more of the following is true
 - the consumers are not receiving any events
 - the events do not seem to be written to disk by the CSL
 - no files for the runs you are taking appear in the ”look” area on fcdfsgi2

Some things you should check before paging a CSL expert:

- Is the CSL receiving any events?
- If the CSL is not receiving events...
- Is the CSL sending events to consumers?
- Is the CSL writing events to disk?
- Did the CSL send an error message to the Error Logger?

CSL ACE web pages describes how to answer these questions.

AFTER going through the checklist, if you still think there is a problem with the CSL, then page a CSL expert.

Online Calibrations

Arnd Meyer, Fermilab

March 27, 2002

Overview

- It is the responsibility of the DAQ ace to run online calibrations once per day.
- “Online calibration”
 - Ace initiates some kind of “pulsing” for system
 - The “data” from the pulse is read out from the Front End Readout crates
 - “Data” used to form calibration constants, which are used to correct the data.

Offline vs. Online calibration

- This differs from “offline calibrations”, in which real data from collisions are used to find constants.
 - Systems need offline and online calibrations for different types of constants
 - Aces only responsible for the online calibration.

X-mode vs D-mode

- **X-mode:** Front-End crate processes data, forms constants, forms a calibration bank, sends calibration bank to consumer, consumer writes to DB
 - COT calibration
 - Calorimeter QIE calibrations
- **D-mode:** Data sent from FER crate to consumer, consumer processes data, forms constants, writes to DB.
 - Silicon

Hardware vs Software EVB

- Standard data taking is done with the “Hardware” Event Builder.
- Most online calibrations (exception: Silicon) are done with the “Software” Event Builder
 - Software EVB connects to Consumer Server/Logger
 - CSL connects to the Calibration Consumer

Pulsing

- Generally, it is not the detector itself which gets “pulsed”, but its readout electronics:
 - Calorimeter:
 - QIE: Charge injected into QIE
 - LED/Xenon: Light into Phototubes
 - COT: Charge injected into ASDQ readout card
- Exception: Calorimeter source runs. But you’ll never do these!!!

List Of Calibrations

- Calorimeter
 - QIE (CEM,CHA,PEM,PHA,WHA)
 - LED (CEM)
 - Xenon (CEM)
 - Laser (Plug)
 - No consumer yet – expert reads D-banks from disk
- CLC: QIE
- BSC+Miniplugs: QIE
- COT: CotCtt
- Muons (pulses CMP, CMX, BMU, *not* CMU)
 - No consumer, expert reads D-bank from disk

Calibrations (continued)

- ShowerMax (central, plug)
- Roman Pots
- TOF
 - QIE (to calibrate pulse heights)
 - TAC
 - To calibrate timing
 - No consumer yet, expert reads D-banks from disk
- Silicon
 - Two runs needed: DPS on (pedestals), DPS off (noise)
 - Currently D-mode: X-mode calibrations coming soon

Running Calibrations

- Mostly consists of choosing correct run configuration, going through state transitions
- Will give example here for COT and QIE
- Other calibrations, see Ace help:

www-b0.fnal.gov:8000/ace2help/ace_calibrations.html

“Quiet Time”

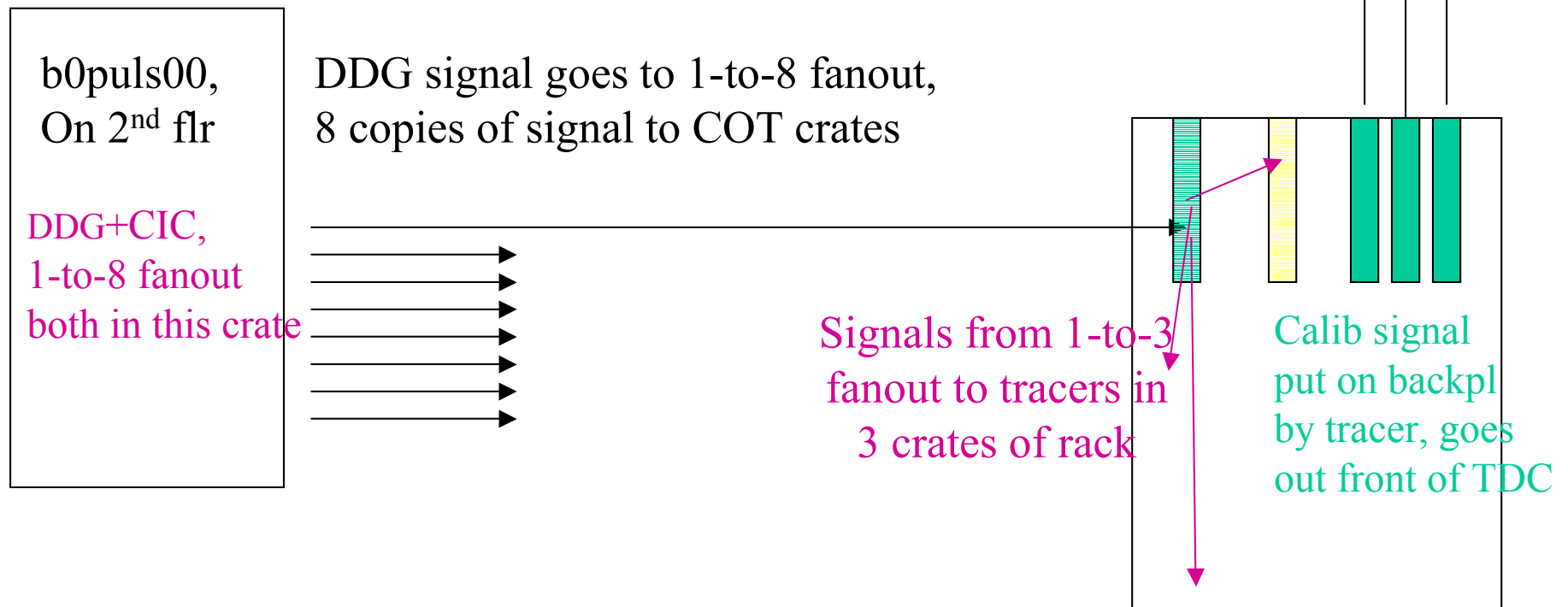
- Some calibrations require absolutely no beam in the Tevatron
- Best time is usually immediately after store has ended
 - SciCo should confirm with MCR about “Quiet time”
 - ~20 min are sufficient for QT calibrations (usually cannot do Plug Laser)
- If there hasn’t been any quiet time for >5 shifts, SciCo can request some after a store

Picture of COT Calib Path

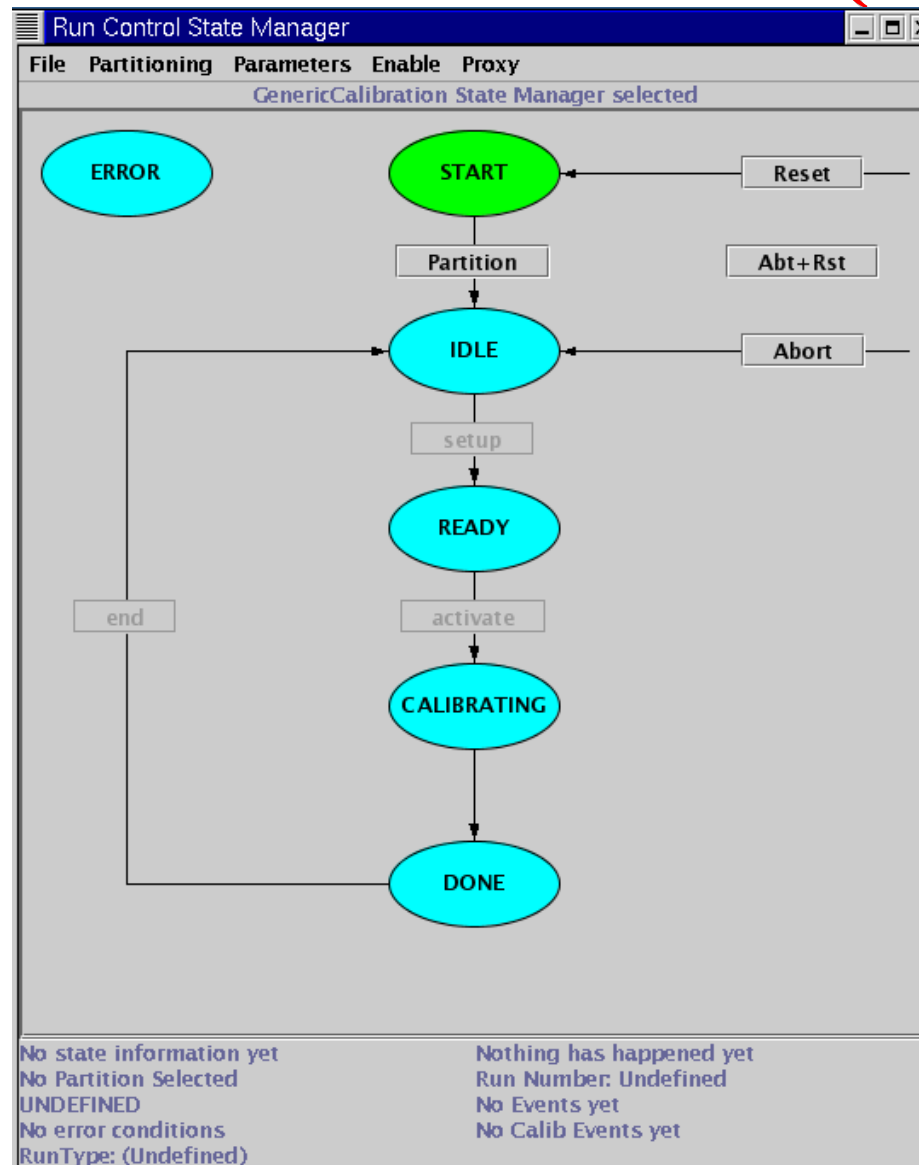
ACE initiates Calibration:

Signal from TS goes to tracer, picked up by CIC (6-to-9 U adapter) which triggers DDG through front panel

Calib signal goes down flat cable/repeater/micro-coax to ASDQ, fires special circuitry on ASDQ which injects charge into readout part of ASDQ, “data” read out thru normal path of micro-coax/repeater/flat cable/TDC



Picture of Calib GUI (COT)



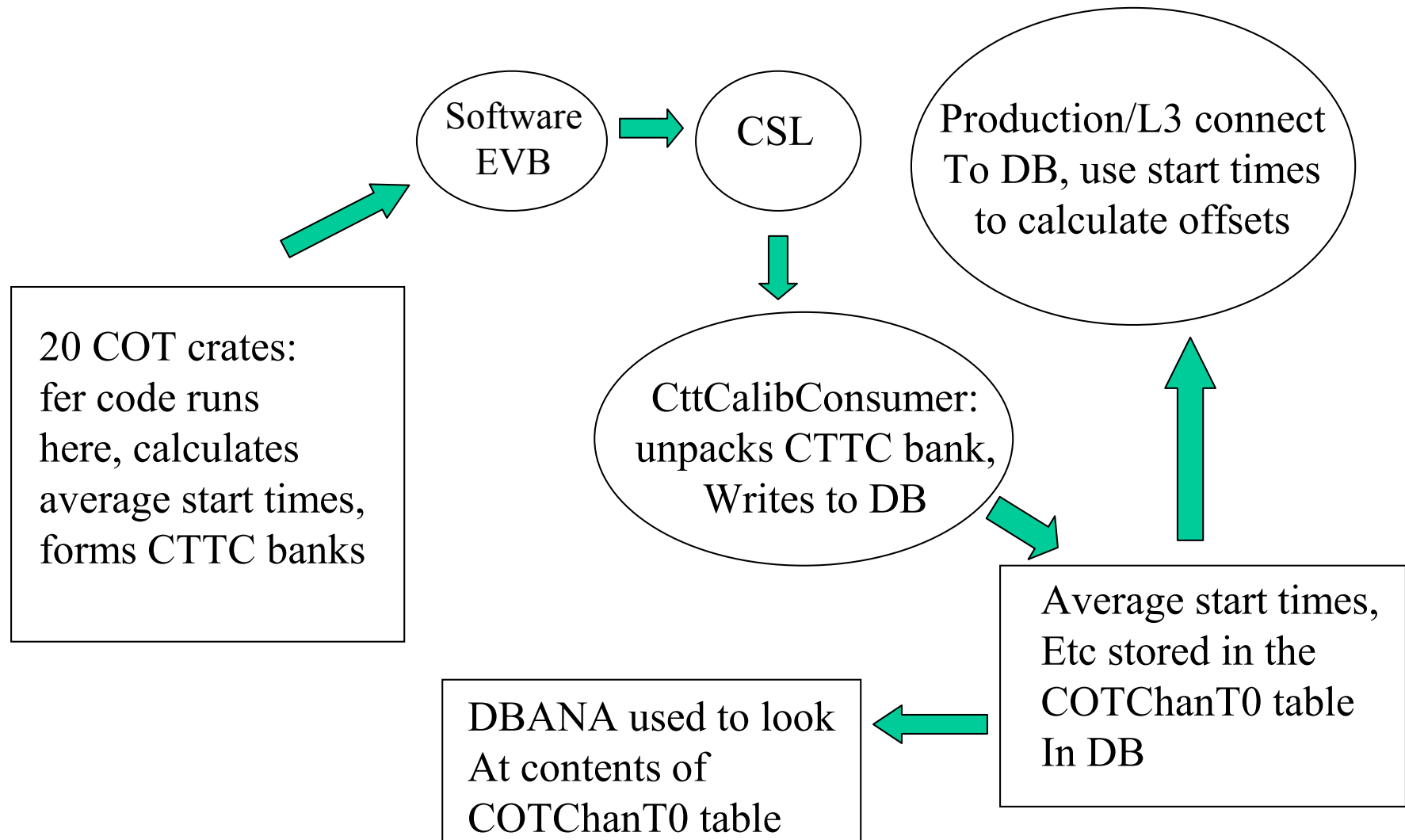
How to run calibration (COT)

- Start run control
- Select state manager: “generic calibration”
- Choose a partition
- Select run configuration:
 - calib → cot → COTCALIB_ACE
- Do Partition → setup → activate. This is what fires the pulser!
- Calibration will take a minute or so. After pulsing is done, CTTC bank formed and sent to SEVB, then to consumer. Will take consumer another minute or so to write data to COTChanT0 table.

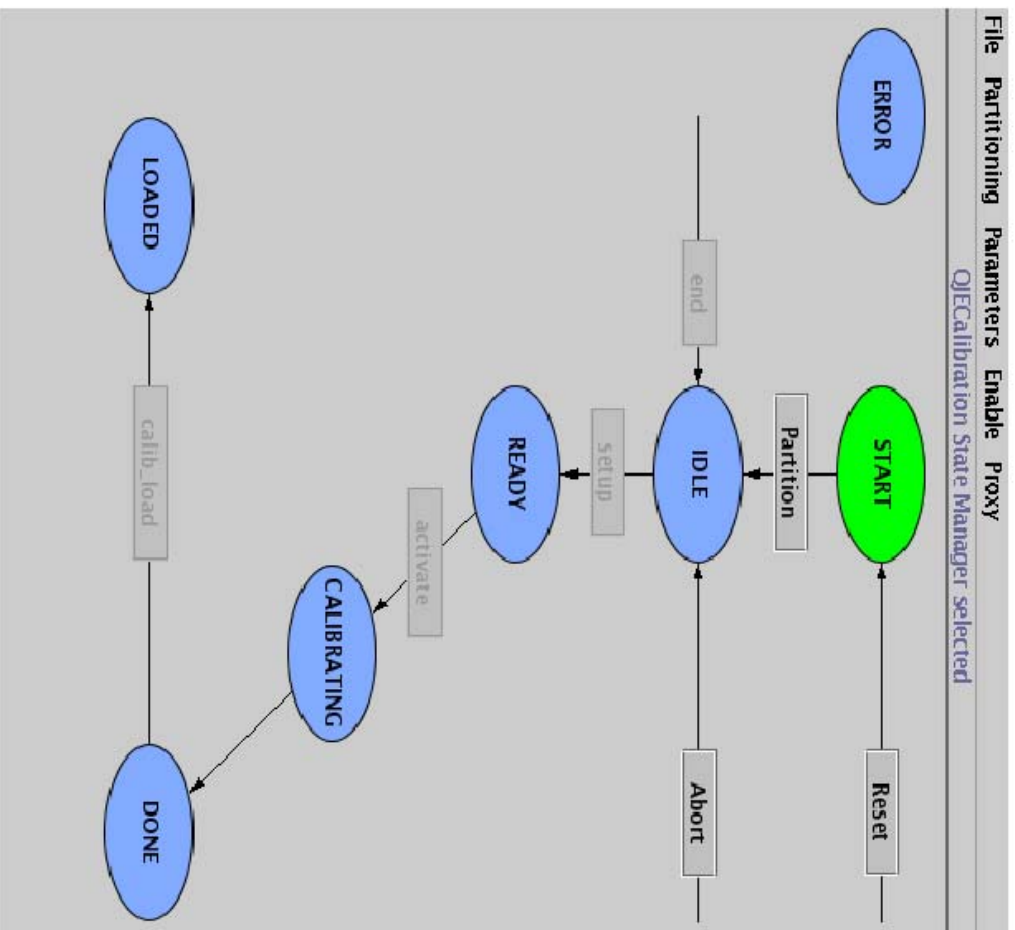
COT calibration
consumer



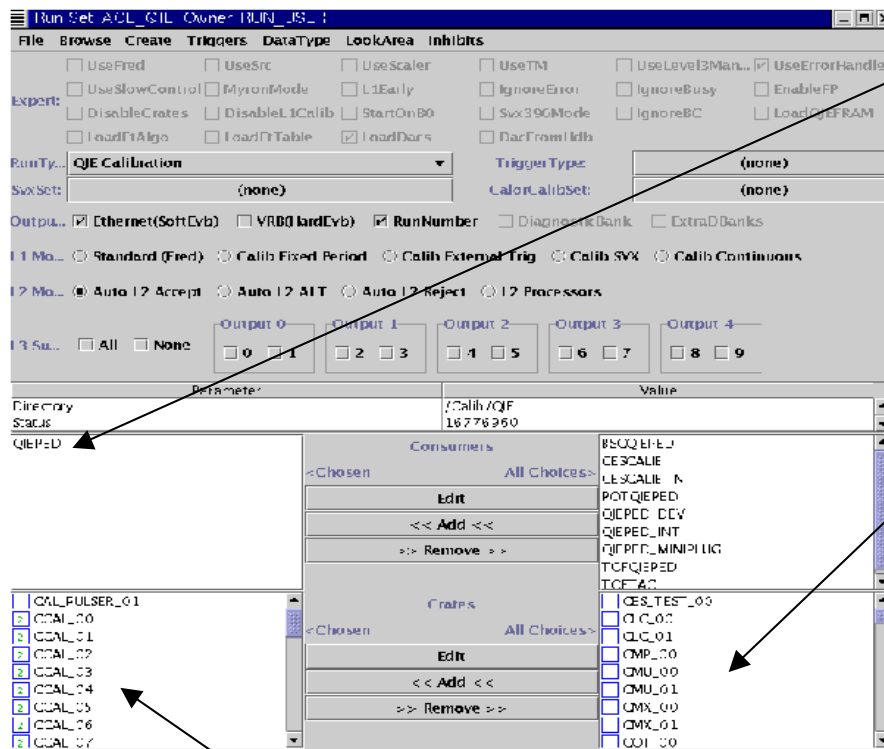
Picture of Calibration chain (COT)



QIE calibration GUI



Configuration for QIE calib



Qie calib consumer

Crates not in run

Crates in run

Where are constants applied?

- COT: constants read from database and applied at L3/offline
- Calorimeter:
 - QIE: constants applied in the readout electronics
 - Run control has extra button, “download”
 - You’ll rarely (maybe never) use this
- Muons: just used for expert monitoring

Checking Calibrations

- Use **DBANA** to verify calibration made it into database
 - `~cdfcalib/runDBANA`
- Should see the calibration run listed
- Note: COT calibration only writes new COMPLETE run if the new calibration changes from last COMPLETE run
 - Otherwise, just writes the BAD channels

Calibration Tables

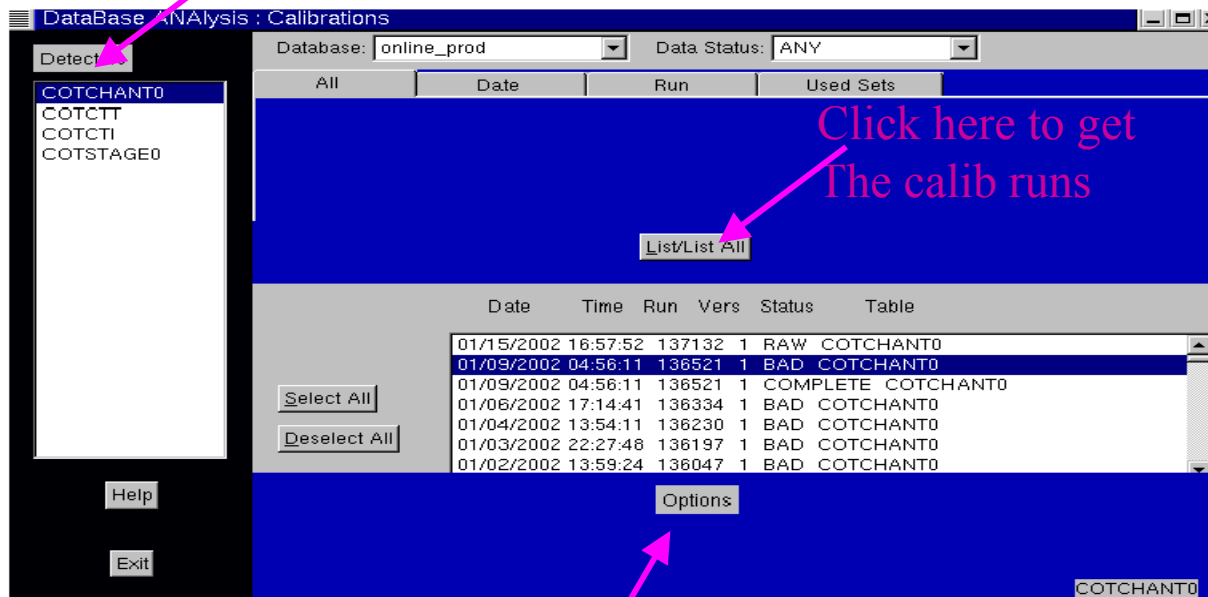
- From Qie calibrations:
 - CEMQIE2, CHAQIE2, PEMQIE2, PHAQIE2, WHAQIE2, CEMPED, CHAPED, PEMPED, PHAPED, WHAPED
 - CLACQIE2, CLAPED (CLC)
 - FDAQIE2 (BSC)
- From LED: CEMLED
- From Xenon: CEMXEF
- From Plug Laser: PHALASER

Calibration Tables (cont)

- From COT: COTChanT0
- From ShowerMax:
 - CESQIE2, CPRQIE2, CCRQIE2, PESQIE2, PPRQIE2, PESQIE2, CESPED, CPRPED, CCRPED, PESPED, PPRPED
- From TOF:
 - TOFQIE, TOFQIEPED
- Silicon tables not listed here

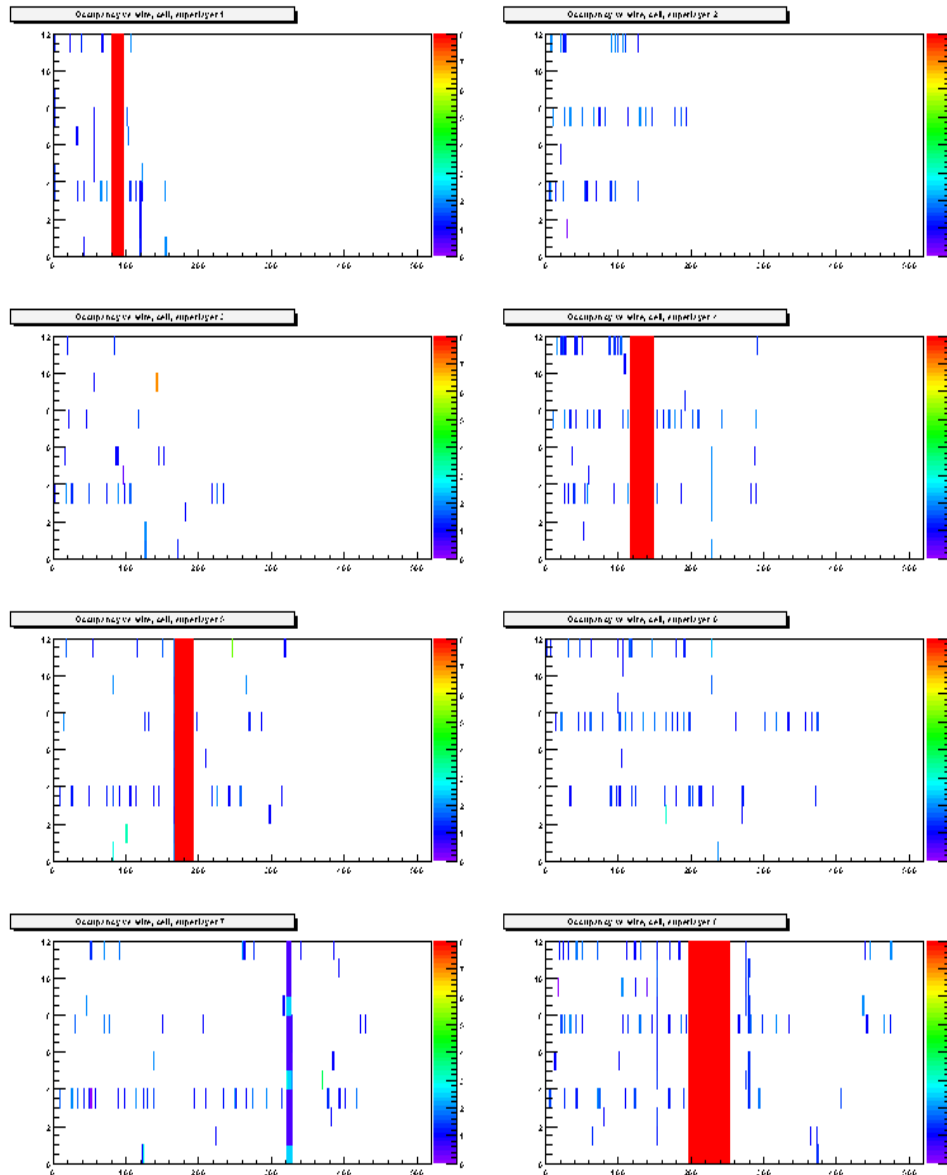
DBANA

Click on “Detectors” for specific detector, click on that detector to get the tables from the calibration



For more example
From more detectors
See the ACE calib
Help page

This will give list of options for plots



Plot of COT occupancy by superlayer, for the bad channels. Occupancy Should be 1 for each channel for the calibration

Troubleshooting

- Software EVB may not be running
 - Can be stopped/started from rc: Proxy → SoftEVB
- Persistent problem with crate (calibration fails during run)
 - Call expert
 - If there is a problem with a crate, probably already showed up during the data taking
- Calibration does not show up in the database
 - Check log file on b0dapNN: ~cdfdaq/consumers/log (do ls -ltr to check for latest log file. Will have name such as “runCotCtt_1*****.log”)
 - Record any errors in e-log, **send email to expert.**
- Online and Offline software do not cohabitate well
 - Always use separate xterms for online (rc etc.) and offline (DBANA) tasks